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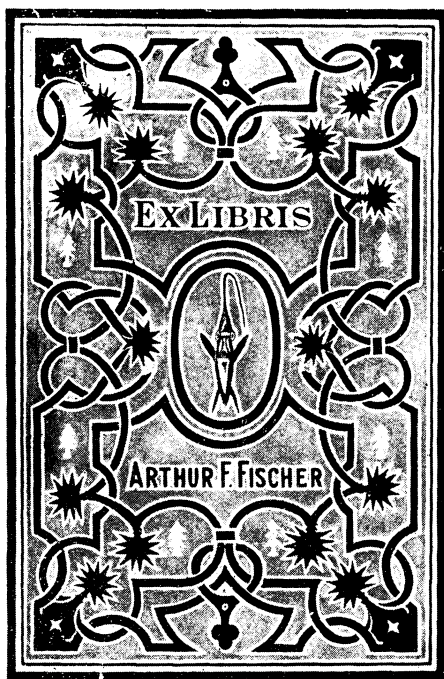
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POMACENTRIDÆ OF THE PHILIPPINE ISLANDS

BY

HERACLIO R. MONTALBAN



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POMACENTRIDÆ OF THE PHILIPPINE ISLANDS

By HERACLIO R. MONTALBAN

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POMACENTRIDÆ OF THE PHILIPPINE ISLANDS

By HERACLIO R. MONTALBAN

INTRODUCTION

This paper deals with the Pomacentridæ, as represented in the waters of the Philippine Archipelago. It contains a systematic record of their characteristics, relationships, and present distribution, based largely upon the material collected under the authority of the Philippine Bureau of Science. It is the result of research performed at Stanford University, and continued in the Bureau of Science laboratory. Since my return to Government service many changes became necessary and they have been incorporated in the present paper based largely on new material, and on additional information concerning the habits and distribution of the fish. I have had the opportunity of examining in the Stanford University museum specimens from other regions for comparative study, and have availed myself of the privilege of using its working library. Almost all the illustrations were made in the Bureau of Science, and were drawn mostly from fresh and from living specimens.

The Philippine Archipelago is composed of over seven thousand islands lying wholly north of latitude $4^{\circ} 30'$ north. The coast line is very irregular, presenting every conceivable variety of topography, and is more or less fringed with growing coral reefs which afford favorable haunts for fishes.

Of the approximately one hundred twenty known species of the family, seventy-eight are represented in Philippine waters. Three of them, believed to be new to science, are here described.

The Pomacentridæ, or damsel fishes, belong with those fishes which from their habits may be termed coral fishes. They are found in greatest abundance in company with other small fishes, such as chætodonts and Apogonichthyidæ, feeding chiefly upon very small marine animals and upon algæ. Many of them are brilliantly colored, the development and distribution of color being apparently dependent upon the agencies of climate and environment, and varying much with age in some species.

In spite of their bright coloration, many species of this family, because of their small size, escape from their enemies by hiding

in coral and rock crevices. A coral head brought to the surface will often yield many specimens when broken into fragments.

The living specimens in the Bureau of Science aquarium have given me excellent opportunities to study their mode of life in captivity; they were taken in *bobos*, or small bamboo traps, at Calapan, Mindoro, which locality has furnished about twenty-five species. Many of the examples listed in this paper were collected by Dr. Albert W. Herre by the use of dynamite, or by means of the fish poison called *tubli*. Some of the material has been collected by me, when I have had the opportunity to observe the habits of the living fish in their natural surroundings.

The pomacentrids, although used as food, are not highly esteemed and are not caught in sufficiently large quantities to be of any economic importance. They are often caught in the *muro-ami* (a type of trap net recently introduced into the Islands by Japanese fishermen) along with chaetodonts, hepatids, siganids, acanthurids, scaroids, labroids, balistids, and others found in the neighborhood of coral reefs. Not infrequently small quantities are obtained by the use of the dip net, the cast net, or the beach seine and, rarely, a few enter the fish corrals along with some of the important food fishes.

In this paper the scales in longitudinal series are counted to the base of the caudal fin, and the scale on the lateral line is not included in counting those in transverse series. The length of the body is measured from the tip of the snout to the base of the caudal rays. The diameter of the eye is given longitudinally in all cases.

I wish to express my indebtedness to Dr. David Starr Jordan for his reading of the original manuscript, and to Prof. John Otterbein Snyder, of Stanford University, and Dr. Albert W. Herre, chief of the division of fisheries, Philippine Bureau of Science, for assistance in various ways and for supervision over the preparation of this paper.

POMACENTRIDÆ

DAMSEL FISHES

Local names: *Aroro baybay*, Ilocano; *las-las*, *tibu*, *tibuk*, or *ulan-ulan*, Tao Sug and Samal; *baro-baro*, *pa-ata*, *paiata*, *palata*, *ulan-ulan*, or *puyong dagat*, Visayan.

Body compressed, short or elongate, covered with ctenoid scales of varying size. Teeth in the jaws small and feeble, either conical or incisorlike; none present along the roof of mouth. Lateral line ceasing before the posterior end of dorsal fin. Spinous and rayed dorsal continuous, even or notched,

both equally well developed; anal with two spines, the soft portion similar to the rayed dorsal; both dorsal and anal scaly at base, sometimes the spinous dorsal naked; ventral thoracic, with a single spine and five rays, the outer rays longest and more or less produced into filaments. Branchiostegals 5 to 7; gills $3\frac{1}{2}$; pseudobranchiæ and air vessel present; pyloric appendages few. Vertebrae $12 + 14 = 26$.

Marine fishes chiefly from the tropical seas of the Indian and Pacific Oceans, with several representatives from the West Indies, and a few from Japan and the Mediterranean Sea.

Key to the Philippine genera of Pomacentridæ.

- a*¹. Scales small, 45 to 72 in lateral series.
 - b*¹. Orbital ring serrated..... **Amphiprion.**
 - b*². Orbital ring not serrated but armed with two very strong spines.
Premnas.
- a*². Scales large or moderate, not more than 30 in lateral series.
 - c*¹. Teeth conical; caudal fin with two or more free spines on each margin of base.
 - d*¹. Hind edge of preopercle serrated.
 - e*¹. Teeth in a villiform band; dorsal spines 11 or 12..... **Dascyllus.**
 - e*². Teeth in a double series; dorsal spines 16 or 17.... **Acanthochromis.**
 - d*². Hind edge of preopercle entire..... **Chromis.**
 - c*². Teeth compressed; base of caudal fin without any free spines.
 - f*¹. One or more of the opercles serrated.
 - g*¹. Preopercle only and, generally, the orbital ring serrated.
 - h*¹. Lips thick, swollen, and completely reversed outward around mouth **Cheiloprion.**
 - h*². Lips not as above..... **Pomacentrus.**
 - g*². Opercles excepting the interopercle serrated; orbital ring entire.
Daya.
 - f*². None of the opercles serrated.
 - i*¹. Teeth in a single series.
 - j*¹. Gill rakers very numerous, over 70 present on first arch.
Hemiglyphidodon.
 - j*². Gill rakers few, about 28 or less present on first arch.
Abudefduf.
 - i*². Teeth in a double series..... **Chrysiptera.**

Genus AMPHIPRION Bloch and Schneider

Amphiprion BLOCH and SCHNEIDER, Syst. Ichth. (1801) 47, 200; *ephippium*.

Prochilus (Klein, Piscis Missus 5: 60, nonbinomial), BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 20; *ephippium*.

Body oblong, compressed, covered with small roughish scales, about 45 to 60 in a longitudinal series; lateral line ending under the posterior end of soft dorsal. All the opercles and the orbital ring serrated, the denticles on the opercular and sub-

opercular bones very long. Teeth in a single series, small and conical. Dorsal fin continuous, even or notched, with 9 to 11 spines.

Brightly colored pomacentrids, occurring from the Red Sea and east coast of Africa through the seas of India to the Malay Archipelago and western parts of the Pacific.

Key to the Philippine species of Amphiprion.

- a¹. Dorsal fin nearly even, not notched, the posterior spines not very much lower than the anterior rays.
 - b¹. Body with three distinct pearl white crossbands; caudal lunate. **A. polymnus.**
 - b². Body with a single transverse band; caudal rounded in the young and subtruncate in the adult..... **A. frenatus.**
- a². Dorsal fin deeply notched, the posterior spines very much shorter than the middle or some of the anterior ones.
 - c¹. Interorbital space naked.
 - d¹. Caudal markedly rounded; body with three permanent crossbands. **A. percula.**
 - d². Caudal subtruncate; body with three vertical bands which vary relatively in size with age, the last one disappearing almost entirely **A. bifasciatus.**
 - c². Interorbital space scaly.
 - e¹. A pearl white vertical band across the opercles..... **A. perideraion.**
 - e². No pearl white vertical band on the opercles..... **A. akallopisos.**

AMPHIPRION POLYMNUS (Linnæus)

PLATE 1, FIG. 1

Perca polymna LINNÆUS, Syst. Nat. ed. 10 1 (1758) 291.

Amphiprion polymnus BLOCH and SCHNEIDER, Syst. Ichth. (1801) 203; CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 297; BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 28; JORDAN and SNYDER, Proc. U. S. Nat. Mus. 24 (1902) 598; JORDAN and SEALE, Proc. Daven. Acad. Sci. 10 (1905) 13, pl. 7; WEBER, Fische der Siboga Exped. (1913) 336.

Prochilus polymnus BLEEKER, Atlas Ichth. 9 (1878) pl. 400, figs. 7 and 8.

Amphiprion chrysopterus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 301; GÜNTHER, Cat. Fishes 4 (1862) 8; JORDAN and DICKERSON, Proc. U. S. Nat. Mus. 34 (1908) 611, fig. 4.

Amphiprion japonicus SCHLEGEL, Fauna Japonica (1846) 66.

Amphiprion chrysargurus RICHARDSON, Ichth. China (1846) 254.

Amphiprion boholensis CARTIER, Verh. Phys. Méd. Ges. Würzburg (1873) 96.

Amphiprion ephippium GÜNTHER, Fische der Südsee 2 (1876) 224, pl. 122, figs. D and C.

Amphiprion snyderi ISHIKAWA, Proc. Dept. Nat. Hist. Tokio Nat. Mus. 1 (1904) 11, pl. 5.

Dorsal X, 15 to 17; anal II, 12 to 15; scales in lateral series 45 to 52; with tubules 33 to 42; between lateral line and origin of dorsal 8 or 9; between lateral line and vent 19 to 23.

Body oblong, the dorsal and ventral outlines equally elevated, the latter more evenly arched, the deepest part of body at origin of dorsal fin 1.9 to 2.1 in length; head 3 to 3.3; depth of caudal peduncle 5.6 to 6.5. The evenly convex interorbital 2.7 to 3.1 in length of head; the circular eye 3.1 to 3.6; the rounded snout 2.8 to 3.2, shorter than maxillary, which is contained 2.5 to 2.8 in head. Mouth very oblique, lower jaw slightly projecting, the maxillary ending posteriorly below front edge of orbit. Preorbital terminating in a strong spine, which is preceded by a shorter one; orbital serrated; opercle with radiating ridges which end in spines.

Head naked on snout, orbital ring, interorbital space, and posterior limb of preopercle; base of vertical fins covered by a low sheath of scales. Third and fourth dorsal spines highest; the last spine higher than the one preceding but lower than first dorsal ray. Caudal lunate; both pectoral and ventral fins extending to vent.

Alcoholic specimens either brownish or blackish, very much darker posteriorly and above toward the fins, with three milk white, black-edged transverse bands; the first from nape to interoperculum, touching hind edge of orbit; the second from the last two dorsal spines and the first two dorsal rays to origin of anal, not extending upward into margin of dorsal fin; the third on posterior half of caudal peduncle. Caudal, anal, ventral, and pectoral yellow, and in some cases the last three fins edged with black. In other specimens the anal is chocolate brown, narrowly edged with white.

Here described from thirty-three examples, varying from 19 to 89 millimeters in length. They were collected at the following places: Calapan, Mindoro; Tablas Island; Guindulman, Bohol; Dumaguete, Oriental Negros; Cagayan de Misamis and Zamboanga, Mindanao; and Bungau, Sibutu, Sitankai, and Tango Islands, Sulu Archipelago. Three females, each 79 millimeters in length, collected at Calapan in January, 1923, are about ready to spawn. The Bureau of Science collection has two examples, collected by Mr. Alvin Seale at Hongkong.

This species has been previously reported from the Philippines by Bleeker. Cartier's account of a specimen from Bohol reveals the identity of his species with *Amphiprion polymnus*.

In the Bureau of Science aquarium are four living specimens which are colored as follows: Chocolate brown above and behind, gradually passing into orange yellow on the lower parts including the pectorals, anal, and ventrals; caudal fin and anterior portion of head lemon yellow; side of body traversed by three bright, dark-edged, pearl white bands, the last one of which covers caudal peduncle; dorsal fin chocolate brown, the rayed portion narrowly edged with white; anal fin tipped narrowly with brown.

A fresh specimen, collected by Morden Brown at Tablas Island, had the upper and posterior portions of the trunk deep chocolate brown, which passed into yellowish orange on the lower parts, and into reddish orange anteriorly and on head; spinous dorsal light chocolate brown, the rayed portion much darker and narrowly tipped with whitish; pectoral yellowish orange; ventral and anal orange red, the former with a narrow brown edge anteriorly and the latter on all of the outer portion; caudal fin yellow; three pearl white, black-edged bands traverse the side of body, the last one on the caudal peduncle.

This widely distributed species is known from Zanzibar and Mozambique on the east coast of Africa, through the Indian Ocean and Malay Archipelago, northward to the south of Japan and China, and southward to northern Australia.

AMPHIPRION FRENATUS Brevoort

PLATE 2, FIG. 1

Amphiprion frenatus BREVOORT, Exped. Japan (1856) 263, pl. 6, fig. 3; GILL, Proc. Acad. Nat. Sci. Phila. 11 (1859) 148; DAY, Fishes of India (1878) 378, pl. 80, fig. 2; JORDAN and SNYDER, Proc. U. S. Nat. Mus. 22 (1900) 752.

Amphiprion tricolor GÜNTHER, Cat. Fishes 4 (1862) 8.

Prochilus polylepis BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 22; Atlas Ichth. 9 (1878) pl. 401, fig. 6.

Prochilus ephippium BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 23, in part; Atlas Ichth. 9 (1878) pl. 401, fig. 1.

Prochilus macrostoma BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 25; Atlas Ichth. 9 (1878) pl. 401, fig. 5.

Prochilus melanopus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 26; Atlas Ichth. 9 (1878) pl. 401, fig. 7.

Dorsal IX or X, 17 to 19; anal II, 14 to 16; scales in lateral series 47 to 49; with tubules 31 to 38; between lateral line and origin of dorsal 9; between lateral line and vent 17 to 21.

Body oblong, its depth 1.7 to 1.9 in length; head 3 to 3.1; depth of caudal peduncle 5.6 to 5.9. The convex interorbital 2.9 to 3.2 in length of head; the small round eye 4 to 4.1; the snout

and maxillary equal in length, each 2.8 to 2.9 in head. Mouth oblique, lower jaw slightly projecting, posterior end of maxillary not quite touching vertical through anterior edge of orbit. A single row of small, conical teeth present. Preorbital above hind end of maxillary wider than half diameter of eye. Orbital ring and vertical edge of preopercle strongly serrated, the anterior spine of the former larger but not much longer than the rest of the serrations. Opercle, subopercle, and interopercle with radiated ridges ending in spines.

Small scales covering head and body; interorbital, snout, orbital ring, and outer portion of opercle naked. Dorsal fin nearly even, the posterior spines having almost the same height; soft dorsal and anal pointed posteriorly and about equal in height; caudal slightly emarginate in the adult and rounded in the young.

Brownish black in alcohol, lighter on chin and breast; a pearl white band edged with black descending over the opercles immediately behind eye; caudal, pectoral, ventral, and vertical fins yellowish.

The above account is based upon five specimens, ranging from 59 to 95 millimeters in length, two of which were collected at San Fernando, La Union, and the others at Calapan, Mindoro.

Two living specimens in the Bureau of Science aquarium, taken at Calapan, Mindoro, have the sides black which passes into bright orange red toward anterior portion of head, and toward breast, belly, vertical fins, and caudal; base and outer portion of ventral black, the rest of the fin orange red; anal spines black; pectoral bright orange red; the transverse band behind eye bright pearl white, edged in front and behind with black. A fresh specimen obtained at Tablas Island had the sides black, fading into deep carmine red on anterior portion of head and on breast, and toward the outward portions of dorsal, anal, and caudal fins; base of pectoral black, the remaining portion carmine red; ventral spine and rays black, the membranes reddish; a bright, pearl white, black-edged transverse band just behind eye.

All the examples I have examined are fairly large and have the pearl white transverse band on each side of head. Because of the presence of this band I have placed this species as distinct from *Amphiprion ephippium*. Although the specimens differ somewhat in the width of the vertical band and in the

number of the dorsal spines, they probably all belong to the same species.

This species, which is new to the Philippines, occurs from Madagascar and the Andamans to the Malay Archipelago, northward to the Riu Kiu Archipelago and southward to Australia.

AMPHIPRION PERCULA (Lacépède)

PLATE 2, FIG. 2

Lutjanus percula LACÉPÈDE, Hist. Nat. Poiss. 4 (1803) 239, 248.

Amphiprion percula CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 298; GÜNTHER, Cat. Fishes 4 (1862) 6; Fische der Südsee 2 (1876) 225, pl. 124, fig. A; DAY, Fishes of India (1878) 379, pl. 80, fig. 4; WEBER, Fische der Siboga Exped. (1913) 335.

Prochilus percula BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 33; Atlas Ichth. 9 (1878) pl. 400, fig. 2.

Anthias polymna var. BLOCH, Ichth. 9 (1797) 91, pl. 316, fig. 3.

Dorsal XI, 15 or 16; anal II, 12 to 14; scales in lateral series 50 to 60; with tubules 33 to 42; between lateral line and origin of dorsal 9; between lateral line and vent 23 to 28.

Body oblong, moderately compressed, deepest below third and fourth dorsal spines, being 2 to 2.4 in length; head 3 to 3.2; depth of caudal peduncle 5.3 to 6.4. The narrow, almost flat interorbital 3.5 to 4 in length of head; the small circular eye 3.3 to 4.3, situated high up on side of head; the rounded snout 2.7 to 3.1, its tip lower than the inferior margin of orbit; the maxillary 2.4 to 2.7, or slightly longer than snout. Mouth oblique, jaws even; teeth in a single row, their edges rather blunt. Greatest width of preorbital more than half the diameter of eye, its posterior edge serrated; suborbital and preopercle with radiating ridges which terminate in spines.

Top of head, snout, orbital ring, and outer margins of opercular bones naked. Dorsal spines moderately high, the third and fourth highest, while the posterior ones are very low. Dorsal fin deeply notched; its rayed portion and that of anal equal in height; caudal rounded; both pectoral and ventral fins rounded and extending to vent.

Color in alcohol ranges from light yellowish brown to dark brown, with three pearl white, black-margined crossbands; the first concave anteriorly across hind portion of head; the second angularly pointed in front from posterior dorsal spines to origin of anal fin; the third around caudal peduncle; spinous dorsal and ventrals edged with black; soft dorsal and other fins with black and white margins.

The description given is from a large number of specimens, 22 to 59 millimeters long, taken at the following localities:

Calapan, Mindoro	88
Bantayan Island	7
Zamboanga and Basilan Island	13
Samal Island	10
Sitankai Island and Jolo, Sulu Archipelago	9

Of this list of examples thirteen are ripe females, 45 to 59 millimeters in length, collected in April, 1923; May, 1909; July, 1908; and December, 1925.

There are in the Ateneo de Manila museum one example from Capas, Balayan Bay, Batangas, and several from Surigao. The first Philippine record of this species is of one specimen, collected by Weber at Sanguisiapo, Sulu Archipelago.

This fish is well known for its small size and beautiful bright coloration, the three milk white transverse bands being very well marked. The ground color of the living specimens in the Bureau of Science aquarium varies from orange red to light carmine red, crossed by three bright, transverse, pearl white bands which are edged in front and behind with black; all the fins colored similarly to body; spinous dorsal and ventrals margined with jet black; the rayed dorsal and other fins with a white edge and a submarginal band of jet black.

A common reef-dwelling species, occurring from the seas of India and China, through the Indo-Australasian Archipelago, to Australia and Melanesia.

AMPHIPRION BIFASCIATUS (Bloch)

PLATE 3, FIG. 1

Anthias bifasciatus BLOCH, Ichth. 9 (1797) pl. 316, fig. 2.

Amphiprion bifasciatus BLOCH and SCHNEIDER, Syst. Ichth. (1801) 204; CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 294; GÜNTHER, Cat. Fishes 4 (1862) 3; DAY, Fishes of India (1878) 379, suppl., 800.

Holocentrus bifasciatus BLOCH and SCHNEIDER, Syst. Ichth. (1801) 567.

Prochilus bifasciatus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 31; Atlas Ichth. (1878) pl. 400, figs. 4, 5, and 6.

Lutjanus jourdin LACÉPÈDE, Hist. Nat. Poiss. 4 (1803) 191, 235.

Amphiprion laticlavus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 296, pl. 132, fig. 1.

Amphiprion intermedius SCHLEGEL and MÜLLER, Overz. Amphi. Verh. Nat. Ges. Ned. Overz. Bezitt. (1839) 18.

Dorsal X, 14 or 15; anal II, 12 or 13; scales in lateral series 47 to 50; with tubules 37 to 41; between lateral line and origin of dorsal 8; between lateral line and vent 18 to 20.

Body oblong, deepest at about the origin of dorsal fin, being 2.2 to 2.3 in length; head 3.1 to 3.3; depth of caudal peduncle 5.6 to 6.5. The broad, strongly and evenly convex interorbital 2.8 to 3.1 in length of head; the circular eye 2.6 to 3.4; the short, rounded snout 2.9 to 3.3, or shorter than maxillary which is contained 2.5 to 2.6 in head. Mouth very oblique, lower jaw slightly projecting, tip of snout a little lower than inferior margin of eye. Teeth conical and uniserial, those in front slightly curved. Preorbital terminating posteriorly in a short spine; suborbital with a rather indistinct denticulation; all the opercular bones serrated.

Snout, orbital ring, interorbital space, and edges of preopercle naked; rest of head covered with small scales. A deep notch between the spinous and the rayed dorsal; dorsal spines low and stout, the third the highest. Soft dorsal rounded; rayed anal slightly angular; caudal slightly convex; pectoral and ventral equal in length, the former ending before vent.

Chestnut brown in alcohol, with two or three milk white cross-bands; the first descending from nape to subopercular bone, covering most of opercle and touching anteriorly hind margin of orbit; the second band descending from base of the last three dorsal spines and anterior dorsal rays to below the lateral line, and continued posteriorly through the upper portion of dorsal rays; the third band, if present, occupying upper half of caudal peduncle. A good series of specimens would show a decidedly marked shortening of the second band and a gradual disappearance of the third. Ground color of fresh specimens blackish brown, with yellowish wash in front, below, and on pectoral fin.

Of this species I have examined eight examples, 43 to 78 millimeters in length, from Bauang Sur, La Union; Atimonan, Tayabas; Calapan, Mindoro; and Estancia, Panay. A female specimen collected at Calapan in March, 1924, is 60 millimeters long and is nearly ready to spawn. There are two specimens from Cebu, Cebu, and one from Corregidor Island in the Ateneo de Manila museum.

This species is found from the Andamans, throughout the East Indies, to New Guinea.

AMPHIPRION PERIDERAION Bleeker

PLATE 4, FIG. 1

Amphiprion perideraion BLEEKER. Nat. Tijds. Ned. Ind. 8 (1855) 437;

GÜNTHER, Cat. Fishes 4 (1862) 9.

Prochilus perideraion BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 37; Atlas Ichth. 9 (1878) pl. 400, fig. 1.

Amphiprion perideraeus GÜNTHER, Fische der Südsee 2 (1876) 226.

Dorsal X, 16; anal II, 12 to 14; scales in lateral series 45 to 47; with tubules 35 to 37; between lateral line and origin of dorsal 7 or 8; between lateral line and vent 20 to 22.

Dorsal outline of head almost straight; body oblong, its depth 2.2 to 2.4 in length; head 3.2 to 3.3; depth of caudal peduncle 5.3 to 6.5. Interorbital space slightly convex, nearly as wide as length of snout, which is contained 3 to 3.3 in length of head; eye 3.3 to 3.6 in head. Mouth small, strongly oblique, the lower jaw slightly projecting; maxillary 2.5 to 3 in head, extending posteriorly to below anterior edge of orbit. Teeth conical, in a single series. Suborbital provided with a large, strong spine on anterior part, which is followed by a row of shorter ones; posterior limb of preopercle bluntly serrated. Subopercular, interopercular, and opercular bones with radiating ridges terminating in sharp spines.

Snout, orbital ring, and chin naked; dorsal fin with a low notch superiorly: fourth dorsal spine highest. Rayed dorsal and anal fins slightly angular; the other fins rounded; ventral shorter than pectoral and ending at anterior margin of anus.

Yellowish orange in alcohol, an indistinct light dot on the center of each scale; a pearl white longitudinal band running along the median of head and continued backward along base of dorsal fin to back of caudal peduncle; all the fins yellowish.

The six specimens above described were collected at Calapan, Mindoro, and range in length from 34 to 55 millimeters.

Three living specimens in the Bureau of Science aquarium, obtained at Calapan, Mindoro, are orange yellow, with a bright, pearl white line along the back from over the head, through base of dorsal fin to top of caudal peduncle, and with a vertical band of like color across the opercles. The light spot on each scale is hardly visible.

This species, which has not been previously listed from the Philippines, is found in the East Indies, Amboina, and the Palau Islands.

AMPHIPRION AKALLOPISOS Bleeker

Amphiprion akallopisos BLEEKER, Nat. Tijds. Ned. Ind. 4 (1853) 281.

Amphiprion akallopisos GÜNTHER, Cat. Fishes 4 (1862) 10; DAY, Fishes of India (1878) 380.

Prochilus akallopisos BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 35; Atlas Ichth. 9 (1878) pl. 400, fig. 3.

Dorsal X, 16; anal II, 12; scales in lateral series 56; with tubules 34; between lateral line and origin of dorsal 7; between lateral line and vent 19.

Body oblong, with the anterior dorsal profile nearly straight; depth 2.4 in length; head 3.5; depth of caudal peduncle 6.4. Interorbital space slightly convex, 3.3 in length of head, or about as wide as length of snout or diameter of eye. Maxillary extending posteriorly to below front edge of orbit, its length greater than the width of the interorbital space. Teeth in a single row, conical, with blunt tips. Suborbital with pointed spines; posterior edge of preopercle with few blunt serrations; the other opercular bones with radiating ridges which terminate in sharp spines.

Scales on top of head extending to above front edge of orbit; none on orbital ring and preopercular edges. Dorsal fin with a slight notch superiorly. Spinous dorsal rather low, the fourth spine highest.

Yellowish orange in alcohol, with a light center on each scale; a trace of the blue line present on middle of forehead, at base of dorsal fin, and on back of caudal peduncle.

Described from a single specimen, 45 millimeters in length, collected at Calapan, Mindoro.

This species, which is new to the Philippines, is known from the coasts of Priaman, Bouro, Ceram, and Amboina. It closely resembles *Amphiprion perideraion* Bleeker, and differs from it in the absence of the vertical pearl white band on the opercles.

Genus *PREMNAS* Cuvier

Premnas CUVIER, Regne Anim. ed. 1 (1817) 106; *biaculeatus*.

Body ovate, compressed. Each jaw with a series of small, conical teeth. All the opercles serrated; orbital ring with two strong spines. Scales small, about 66 to 72 in longitudinal series; lateral line ending below the posterior portion of soft dorsal. Dorsal fin continuous, notched, with 10 spines.

Only a single species is known of this genus.

PREMNAS BIACULEATUS (Bloch)

Chaetodon biaculeatus BLOCH, Ichth. 7 (1797) 7, pl. 219, fig. 2.

Premnas biaculeatus BLEEKER, Nat. Tijds. Ned. Ind. 6 (1854) 105; GÜNTHER, Cat. Fishes 4 (1862) 10; BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 17; Atlas Ichth. 9 (1878) pl. 402, figs. 7 and 9; DAY, Fishes of India (1878) 380, pl. 80, fig. 5; WEBER, Fische der Siboga Exped. (1913) 334.

Premnas trifasciatus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 304.

Premnas simicinctus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 307, pl. 133, fig. 1.

Dorsal X, 16 to 18; anal II, 14 to 16; scales in lateral series 66 to 72; with tubules 46 to 54; between lateral line and origin of dorsal 12 to 14; between lateral line and vent 28 to 32.

Body oblong, 1.9 to 2 in length; head 2.9 to 3; depth of caudal peduncle 4.9 to 5.4. Interorbital space wide, evenly arched, and contained 3.5 to 3.7 in length of head; diameter of the small round eye 4.9 to 5; snout, which is about as long as the maxillary, contained 2.8 to 3 in head. Tip of snout rounded, away below the horizontal passing through lower edge of orbit. Mouth slightly oblique, jaws about equal; posterior end of maxillary a little behind vertical through anterior margin of eye; a single row of conical teeth present. Preorbital ending in a strong spine, its greatest width almost equal to the eye's diameter; suborbital with a much longer spine; all the opercles serrated.

A naked area on interorbital space, snout, and chin; outer edges of preopercle, subopercle, and opercle unscaled. Second, third, and fourth dorsal spines highest, each being almost twice in head. Rayed dorsal and anal fins slightly angular; caudal, pectoral, and ventral fins rounded, the last-named two ending at base of anal spines.

In alcohol the color varies from dull yellow to chocolate brown, with three black-edged, white crossbands, which are wider superiorly; the first band, convex posteriorly, crossing over hind portion of head to subopercle; the second descending from the last three dorsal spines to origin of anal fin; the third around caudal peduncle; the last two bands slightly curved and angularly produced forward along middle part, this process being absent in some examples; all the bands named vary in length with age.

The Bureau of Science collection contains seven specimens, 35 to 108 millimeters long, from Calapan, Mindoro; Bantayan Island; Inabanga, Bohol; Surigao, Mindanao; and Bungau, Tango, and Sitankai Islands, Sulu Archipelago. The only previous record of this species from the Philippines is that of Günther.

In the Bureau of Science aquarium there is a fairly large living specimen, which is deep cherry red, traversed by three brilliant pearl white bands; pectoral is narrowly edged with whitish and has a narrow submarginal band of black; all the other fins are narrowly edged with black.

Easily recognized by the two strong sharp spines directed posteriorly from orbital ring and by the three well-defined, milk white, vertical bands.

This species ranges from the seas of India throughout the East Indian Archipelago to New Guinea.

Genus *DASYLLUS* Cuvier

Dascyllus CUVIER, Regne Anim. ed. 2 (1829) 91, *aruanus*; also written *Dascillus*.

Tetradrachmum CANTOR, Malayan Fishes (1850) 241, *aruanus*.

Body ovate or nearly orbicular. Teeth villiform, small and conical, in a narrow band, with an outer series of somewhat larger ones. Scales 26 or less in longitudinal series; lateral line ceasing below the soft dorsal fin. Preopercle and sometimes the orbital ring and opercular bone serrated. Dorsal fin not notched, with 12 or 13 spines; caudal fin with two or more free sharp spines on each margin of base.

This widely distributed genus occurs from the Red Sea and east coast of Africa through the seas of India and the Malay Archipelago to Polynesia and New Zealand.

Key to the Philippine species of *Dascyllus*.

- a*¹. Median dorsal spines longer than the rest; body with three distinct black crossbands.
- b*¹. First two bands vertical; caudal fin with a large black blotch. *D. melanurus*.
- b*². First two bands oblique; caudal fin without a black blotch *D. aruanus*.
- a*². Premedian dorsal spines longer than the others.
- c*¹. Body with milk white spot on each side *D. trimaculatus*.
- c*². Body without any milk white spot.
- d*¹. Body with one or two broad crossbands..... *D. marginatus*.
- d*². Body not banded..... *D. caudofasciatus*.

DASYLLUS MELANURUS Bleeker

Dascyllus melanurus BLEEKER, Nat. Tijds. Ned. Ind. 6 (1854) 109; GÜNTHER, Cat. Fishes 4 (1862) 12; Fische der Südsee 2 (1876) 236, pl. 124, fig. C; BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 149. *Tetradrachmum melanurus* BLEEKER, Atlas Ichth. (1878) pl. 409, fig. 1.

Dorsal XII, 11 to 13; anal II, 12 or 13; scales in lateral series 25; with tubules 16 or 17; between lateral line and origin of dorsal 3; between lateral line and vent 9.

Body ovate, rather deep, 1.6 to 1.7 in length; head 2.6 to 3; depth of caudal peduncle 5.3 to 5.9. Interorbital space slightly and evenly arched, rather broad, 2.5 to 2.7 in length of head; eye rounded and large, 2.7 to 3 in head; snout blunt and short, 3.4 to 3.8 or shorter than maxillary which is contained 2.8 to 3.1 in head. Mouth very oblique, jaws equal, the posterior end of maxillary under or a little before front margin of eye. Teeth

in a narrow band, villiform, those on outer set large and conspicuously pointed. Width of preorbital at angle of mouth less than half an eye diameter; suborbital narrow, finely serrated; posterior and inferior edges of preopercle denticulated.

Head everywhere covered with rough and thick ctenoid scales. Dorsal spines rather strong and elevated, decreasing in height posteriorly from the fourth. Soft dorsal pointed; soft anal rounded; caudal forked, with two prominent spines on each margin of base; both pectoral and ventral extending to anus.

Ground color of alcoholic specimens dull yellow, with three broad, black crossbands, the first running vertically from crown of head through eye to chin, leaving a yellowish area on anterior portion of head, the second band descending from the first four dorsal spines toward anterior half of ventrals, the third crossing body from the soft dorsal to the anal fin. Caudal yellowish at base and on upper and lower margins, the remainder black; pectoral blackish, with a dusky wash at base; ventrals black; posterior rays of vertical fins tipped with yellow.

Here described from thirty-six specimens, 13.5 to 48 millimeters long, from Puerto Galera and Calapan, Mindoro; Canigaran, Palawan; Samal Island and Cotabato, Mindanao; and Basbas and Sibutu Islands, Sulu Archipelago. A female example, 44 millimeters long, taken at Calapan in January, 1923, is in near-breeding condition; two others, 36 and 39.5 millimeters in length, obtained at Canigaran in November, 1925, are ripe females.

This species has been reported from Cagayancillo by Jordan and Richardson. It is known throughout the East Indies eastward to the Carolines and Melanesia.

DASYLLUS ARUANUS (Linnaeus)

Chaetodon aruanus LINNÆUS, Syst. Nat. ed. 10 1 (1758) 464;

BLOCH, Ichth. 6 (1799) 45, pl. 198, fig. 2.

Lutjanus aruanus LACÉPÈDE, Hist. Nat. Poiss. 4 (1803) 720.

Pomacentrus aruanus RÜPPELL, Fische des Rothen Meers (1828) 39.

Dasyllus aruanus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5

(1830) 325; BLEEKER, Nat. Tijds. Ned. Ind. 6 (1854) 108; GÜNTHER,

Cat. Fishes 4 (1862) 12; Fische der Südsee 2 (1876) 235, pl. 124,

fig. B; MEYER, Ann., Soc. España Hist. Nat. 14 (1885) 12; JORDAN

and SEALE, Bull. U. S. Bur. Fisheries 25 (1906) 290; 26 (1907) 27;

FOWLER and BEAN, Proc. U. S. Nat. Mus. 62 (1922) 49.

Chaetodon araneus BENNETT, Fishes of Ceylon (1834) 17, pl. 17.

Tetradrachmum arcuatum CANTOR, Cat. Malay. Fishes (1850) 241;

BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 147; Atlas Ichth. 9

(1878) pl. 409, fig. 6.

Tetradrachmum aruanum DAY, Fishes of India (1878) 381, pl. 80, fig. 6; WEBER, Fische der Siboga Exped. (1913) 357.

Dorsal XII, 11 to 13; anal II, 11 or 12; scales in lateral series 25 or 26; with tubules 15 to 18; between lateral line and origin of dorsal 3 or 4; between lateral line and vent 10.

Body ovate and slightly elevated, dorsal outline deeper than the ventral; depth of body 1.6 to 1.8 in length; head 2.7 to 3.2; depth of caudal peduncle 5.5 to 6.1. The wide, slightly and evenly convex interorbital 2.5 to 2.9 in length of head; the large, rounded eye 2.5 to 3; the short, slightly rounded snout 3 to 3.7 or shorter than maxillary, which is contained 2.7 to 3.1 in head. Mouth strongly oblique, jaws equal, maxillary extending posteriorly to below anterior margin of orbit. Width of preorbital at hind end of maxillary less than half diameter of eye; sub-orbital, and the edges of the preopercular and opercular bones strongly denticulated.

Head covered everywhere with strong, rather thick ctenoid scales. Dorsal spines growing lower consecutively toward the last from the sixth, which is as high as the preceding one. Soft dorsal pointed; rayed anal rounded; pectoral extending to anal opening; ventral ending at origin of anal fin; caudal deeply forked, with two prominent and sharp spines on each of the upper and lower margins of base.

Body yellowish, with three black crossbands, the first running obliquely from origin of spinous dorsal through eye to chin and jaws, leaving a yellowish area in front of head, the second slightly curved, descending from base of fifth to the eighth dorsal spine through base of and under pectoral fin to ventrals, the third crossing vertically the vertical fins and the posterior portion of trunk; membranes of spinous dorsal blackish; pectorals, caudal, and tips of soft dorsal and anal fins yellow.

This easily recognizable fish is rather common in the Philippines, and numerous specimens, ranging from 11 to 53 millimeters long, were collected at the following places: Manila; Cavite, Cavite; Puerto Galera, Baco, and Calapan, Mindoro; Bantayan Island and Cebu, Cebu; Puerto Princesa and Canigaran, Palawan; Tagbilaran, Bohol; San Juan, Siquijor Island; Zamboanguita, Oriental Negros; Cagayan de Misamis, Zamboanga, Davao, and Samal Island, Mindanao; and Tandubas, Bungau, Bilatan, Sibutu, and Sitankai Islands, Sulu Archipelago. It apparently breeds throughout the year, since a number of the above examples, collected in nearly every month in the year, were found on examination to be ripe females.

It has been recorded previously in the Philippines by Meyer from Cebu; by Jordan and Seale from Cavite; by Weber from Sanguisiapo, Sulu Archipelago; and by Fowler and Bean from Zamboanga.

A widely distributed species, ranging from the east coast of Africa through the seas of India, China, and the Indo-Malayan Archipelago to Polynesia and New Zealand. Day observes that it is numerous at the Andamans, Nicobars, and Burma, but much rarer in western than in eastern India.

DASYLLUS TRIMACULATUS (Rüppell)

PLATE 5, FIG. 2

Pomacentrus trimaculatus RÜPPELL, Fische des Rothen Meers (1828) 39, pl. 8, fig. 3.

Dascyllus trimaculatus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 330; GÜNTHER, Cat. Fishes 4 (1862) 13; Fische der Südsee 2 (1876) 236; JORDAN and SEALE, Bull. U. S. Bur. Fisheries 25 (1906) 290; 26 (1907) 27.

Tetradrachmum trimaculatum BLEEKER, Atlas Ichth. 9 (1878) pl. 409, fig. 6; DAY, Fishes of India, Suppl. (1888) 801.

Dorsal XII, 13 to 16; anal II, 13 or 14; scales in lateral series 26; with tubules 18 to 20; between lateral line and origin of dorsal 4; between lateral line and vent 11.

Body very deep and much compressed, subcircular in form, dorsal profile a little more elevated than the ventral; deepest portion of body below anterior dorsal spines, 1.5 to 1.7 in length; head shorter than deep, 3.1 to 3.3; depth of caudal peduncle 5.3 to 6. Interorbital space strongly convex and steep, its width 2.5 to 3 in length of head; eye large and rounded, contained 2.5 to 3; the blunt snout 3.1 to 3.5 or slightly shorter than maxillary, which is contained 2.8 to 3.3 in head. Mouth very oblique, jaws equal, the maxillary ending posteriorly below front border of orbit; the conical teeth in a villiform band. Width of pre-orbital at angle of mouth a trifle greater than half the diameter of eye; the narrow orbital ring minutely serrated, as is the preopercle; posterior edge of opercle armed with a flat spine above and minute teeth below.

Head and body entirely covered with scales; base of vertical fins with a rather high sheath of scales. The strong dorsal spines decreasing in height posteriorly from the third. Soft dorsal angular and rayed anal rounded; caudal emarginate, with rounded lobes and two prominent free spines on each margin at base; pectoral ending above anus; ventral extending to base of anal spines.

Ground color of alcoholic specimens blackish, with two large pearl white spots; one, which is indistinct or absent in older specimens, on top of head; the other, which disappears with age, on lateral line below the seventh, eighth, and ninth dorsal spines. Caudal, anal, and ventral fins blackish; spinous dorsal broadly margined with blackish; rayed dorsal and pectoral slightly brownish; each scale of body with a dark edge; lips also dark.

The above description is based upon thirty-one specimens, 17 to 101 millimeters in length, obtained at Monja Island, Corregidor; Calapan, Mindoro; Tablas Island; Puerto Princesa, Palawan; Cagayan de Misamis and Zamboanga, Mindanao; and Sibu and Tambaga Islands, Sulu Archipelago. Five examples taken in April, 1922, at Monja Island, which measure 35 to 101 millimeters in length, are nearly ready to spawn.

Ten living specimens at the Bureau of Science aquarium are dusky purplish, with a dark edge on each scale and brassy reflection below; there is a pearl white spot on top of head and another on lateral line on each side of body; soft dorsal and anal are blackish, while the spinous portions and the other fins are slightly lighter.

Previously reported in the Philippines from Manila by Jordan and Seale. A widely diffused species occurring from the Red Sea and east coast of Africa throughout the seas of India and the Indo-Australasian Archipelago to Polynesia.

DASYLLUS MARGINATUS (Rüppell)

Pomacentrus marginatus RÜPPELL, Fische des Rothen Meers (1828) 38, pl. 8, fig. 2.

Dasyllus marginatus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 329, pl. 133, fig. 2; GÜNTHER, Cat. Fishes 4 (1862) 14.

Dasyllus xanthosoma BLEEKER, Nat. Tijds. Ned. Ind. 2 (1851) 247; GÜNTHER, Cat. Fishes 4 (1862) 14; Fische der Südsee 2 (1876) 237, pl. 124, fig. C.

Tetradrachmum marginatum DAY, Fishes of India (1878) 381, pl. 79, fig. 7.

Heliases reticulatus RICHARDSON, Ichth. China (1846) 254.

Dasyllus reticulatus CARTIER, Verh. Phys. Med. Ges. Würzburg (1873) 97.

Tetradrachmum reticulatum WEBER, Fische der Siboga Exped. (1913) 356.

Dorsal XII, 13 to 16; anal II, 12 to 15; scales in lateral series 25 or 26; with tubules 18; between lateral line and origin of dorsal 4 or 5; between lateral line and vent 11.

Body very deep and much compressed, nearly orbicular in outline; the deepest portion of body at anterior dorsal spines, 1.5 to 1.6 in length; head 3 to 3.3; depth of caudal peduncle 5.4 to 6.1. The steep, evenly convex interorbital 2.4 to 2.9 in length of head; the large, circular eye 2.3 to 3.1; the short, blunt snout 2.8 to 3.4, and nearly as long as or shorter than maxillary, which is contained 2.8 to 3.1 in head. Cleft of mouth almost vertical, jaws even, the maxillary ending posteriorly below or a little before front margin of eye; teeth subequal, the outer ones large, conical, and slightly curved. Orbital ring finely denticulated, its width at posterior end of maxillary less than half an eye diameter; inferior and posterior margins of preopercle serrated; opercle armed behind with a flat, blunt spine, below which are some fine teeth.

Head and body everywhere covered with closely set ctenoid scales; rayed dorsal and anal with a moderately high sheath of scales at base. Dorsal spines strong, decreasing gradually in height from the second to the last. Vertical fins about equal in height; caudal emarginate, with two prominent and free spines on each margin of base; pectoral falcate, about as long as head and extending to anus; ventral slightly longer than pectoral, its tip at base of anal spines.

Ground color in spirits dark violet brown with a dark border to each scale, and a blackish band passing from in front of and at base of the first three spines toward the ventrals, this band becoming less distinct in older specimens; another blackish cross-band may be present between the rayed vertical fins. Front of eyes, lips, and chin black; caudal darker on upper and lower margins; spinous dorsal, anal, and ventrals black.

There are in the Bureau of Science collection thirty-five specimens, measuring from 19 to 85 millimeters long, which form the basis of this description. They were obtained at Puerto Galera and Calapan, Mindoro; Cabalian, Leyte; Cagayan de Misamis and Zamboanga, Mindanao; and Tambagaan, Bungau, and Sitankai Islands, Sulu Archipelago. Included among them are five ripe females, 25 to 62 millimeters long, taken at Calapan, Cabalian, and Cagayan de Misamis, in January, May, and September, respectively, thus indicating that they breed throughout the year.

Three living specimens in the Bureau of Science aquarium are purplish brown, with a silvery luster on the center of each scale; a blackish transverse bar behind head and a second one, rather

indistinct, between the rayed dorsal and anal; dorsal fin entirely chocolate brown, as is the ventral; anal fin chocolate brown near base and lighter on outer portion; caudal colored similarly to body.

Cartier first recorded this species in the Philippines from Bohol as *Dascyllus reticulatus*, and Weber from Sanguisiapo, Sulu Archipelago, as *Tetradrachmum reticulatum*.

This fish, well distinguished from *Dascyllus trimaculatus* by the absence of the milk white spots, is rather common from the Red Sea and east coast of Africa through the Mauritius and the Andamans to south China and the Indo-Australasian Archipelago.

DASCYLLUS CAUDOFASCIATUS sp. nov.

PLATE 6, FIG. 1

Dorsal XII, 11 to 13; anal II, 10 or 11; scales in a lateral series 27; with tubules 17 or 18; between lateral line and origin of dorsal 3; between lateral line and vent 10.

Body ovate and compressed, with the profiles about equally elevated, its depth 2.1 to 2.2 in length; head 3.2 to 3.3; depth of caudal peduncle 6.2 to 6.4. Interorbital space evenly convex, its width equal to maxillary or an eye diameter, which is 2.7 to 2.8 in head; the short, bluntly rounded snout 3.4 to 4.3 in length of head and about twice the width of preorbital at posterior end of maxillary. Eye circular; mouth small, with even jaws and oblique gape; teeth conical, in a villiform band; posterior end of maxillary behind anterior edge of orbit. Orbital ring entire; only the vertical limb of opercle serrated.

Scales on top of head extending almost to tip of snout; orbital ring and the rest of head completely covered with scales; vertical fins with a low basal sheath of scales; cheek with four rows of scales. Lateral line ending posteriorly below anterior half of the rayed dorsal. Dorsal spines decreasing in height posteriorly from fourth or fifth, which is a little lower than the second anal spine; rayed portions of dorsal and anal rounded; caudal fin forked, with the lobes equally produced and with two free spines on each margin of base; pectoral fin 3.7 to 4 in length of body and ending above anus; outer ray of ventral longest and reaching to base of anal spines.

In alcohol the ground color varying from brownish to blackish brown, slightly darker on top of head and back; ventrals and spinous dorsal blackish, the color of the latter extending to the tips of the anterior rays leaving the rest of the fin brownish; anterior two-thirds of anal blackish and the remaining

portion whitish; caudal whitish excepting the upper and lower borders which are broadly blackish; pectoral whitish.

Here described from thirteen specimens, 45 to 54 millimeters in length, collected by Dr. Albert W. Herre at Tambagaan, Bungau, and Sibutu Islands, all of Sulu Archipelago.

This species differs from the other members of this genus in having a blackish longitudinal band on each caudal lobe, and only the hind limb of the preopercle serrated.

Genus ACANTHOCHROMIS Gill

Acanthochromis GILL, Proc. Acad. Nat. Sci. Phila. 15 (1863) 224; *polyacanthus*.

Body oblong, compressed, covered with finely ctenoid scales, about 28 to 31 in longitudinal series; lateral line terminating below base of anterior dorsal rays. Orbital ring and preopercle serrated. Teeth in a double series, conical, those in outer row larger. Dorsal fin continuous and even, with 16 or 17 spines.

This genus is separated from *Chromis* by the serrated orbitals and preopercle, and the greater number of dorsal spines; it differs from *Dascyllus* in the presence of a double series of teeth and of a greater number of dorsal spines also.

ACANTHOCHROMIS POLYACANTHUS Bleeker

PLATE 6, FIG. 2

Dascyllus polyacanthus BLEEKER, Nat. Tijds. Ned. Ind. 9 (1855) 503; GÜNTHER, Cat. Fishes 4 (1862) 15; WEBER, Fische der Siboga Exped. (1913) 357.

Acanthochromis polyacanthus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 151; Atlas Ichth. 9 (1878) pl. 410, fig. 7.

Dorsal XVI or XVII, 14 or 15; anal II, 15 or 16; scales in lateral series 28 to 31; with tubules 19 to 23; between lateral line and origin of dorsal 6 or 7; between lateral line and vent 13 or 14.

The deep oblong body 1.8 to 1.9 in length, with the back and the abdomen about equally elevated; head 3.2 to 3.5 in length of body, its profiles nearly at right angles with each other; depth of caudal peduncle nearly twice in length of head or 6.6 to 7 in that of body. Interorbital space evenly and strongly arched, its width 2.5 to 2.8 in head and much wider than the length of the bluntly rounded snout, which is 3 to 3.9 in head; eye circular and moderate in size, its diameter 2.6 to 3.2 in head and slightly longer than maxillary which ends pos-

teriorly behind anterior edge of orbit and is contained 2.8 to 3.4 in head. Mouth slightly oblique, jaws even, teeth conical and in a double series, those in the outer much larger than those in the inner. The lower edge of orbital ring distinctly serrated; width of preorbital at posterior end of maxillary less than half of eye diameter; both lower and vertical edges of preopercle serrated; opercle unarmed.

Scales finely ctenoid and moderate in size; portion of snout in front of nostrils, anterior half of preorbital, and the entire suborbital naked. Dorsal spines growing higher consecutively toward the last which is about as long as the ventral or the second anal spine; rayed portions of the vertical fins produced along the middle into a point; caudal fin deeply forked, with the upper lobe slightly the longer; pectoral fin longer than head, its tip above base of anterior anal rays; outer ray of ventral produced into a filament, which extends to base of anal spines.

Ground color in alcohol varying from brownish to blackish; body and fins with scattered black spots, which become rather indistinct in some individuals; all the fins colored similarly to body.

Here described from fifteen specimens, 58 to 89 millimeters in length, collected by Herre at Sibutu and Sitankai Islands, Sulu Archipelago.

This species, not hitherto known from the Philippines, occurs elsewhere on the coasts of Sangir, Batavia, and Amboina.

Genus *CHROMIS* Cuvier

Chromis CUVIER, Mem. Mus. Hist. Nat. (1815) 353; *chromis*.

Heliases CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 495; *insolatus*; also written *Heliastes*.

Furcaria POEY, Memorias Cuba 2 (1860) 194; *puncta-multilineatus*.

Ayresia COOPER, Proc. Cal. Acad. Sci. (1863) 73; *punctipinnis*.

Body ovate or oblong, compressed. None of the opercles serrated. Teeth conical, in two or more series. Scales moderate in size, 27 or less in longitudinal series; lateral line ending under the posterior portion of soft dorsal; spinous dorsal scaly or naked; suborbital and lower jaw scaly, the former somewhat adnate to the cheek. Dorsal fin with 12 or 13 spines; each caudal lobe with two or more free sharp spines at base.

Although this genus is found in all tropical seas, it also extends northward to Japan and the Mediterranean, and southward to the coasts of Chile.

Key to the Philippine species of Chromis.

- α^1 . Dorsal spines 13.
- b^1 . Caudal peduncle bright yellow, this yellow area separated abruptly from the ground coloration; each caudal lobe without a longitudinal band *C. xanthurus*.
- b^2 . Caudal peduncle not yellow; each lobe of caudal with a dark longitudinal band.
- c^1 . Longitudinal band on caudal fin broad and rather ill defined. *C. xanthochir*.
- c^2 . Longitudinal band on caudal fin narrow and well marked. *C. scotochilopterus*.
- α^2 . Dorsal spines 12.
- d^1 . Spinous dorsal scaly; no bluish streak across preorbital.
- e^1 . Caudal fin with a blackish brown longitudinal stripe on each lobe. *C. ternatensis*.
- e^2 . Caudal fin uniformly whitish..... *C. dimidiatus*.
- d^2 . Spinous dorsal naked; a short bluish streak across preorbital. *C. caeruleus*.

CHROMIS XANTHURUS Bleeker

Heliases xanthurus BLEEKER, Nat. Tijds. Ned. Ind. 6 (1854) 107;
GÜNTHER, Cat. Fishes 4 (1862) 62.

Chromis xanthurus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877)
159; Atlas Ichth. 9 (1878) pl. 405, fig. 5.

Dorsal XIII, 10 or 11; anal II, 10 or 11; scales in lateral series 27; with tubules 16 to 18; between lateral line and origin of dorsal 3; between lateral line and vent 9.

Body ovate, upper and lower profiles equally curved and tapering behind toward end of tail; deepest part of body at about the middle of ventral, 1.9 to 2 in length; head 3 to 3.4; depth of caudal peduncle 5.9 to 6.5. Interorbital space strongly convex, slightly bulging on top of head, rather broad, 2.7 to 2.9 in length of head; eye circular, large, contained 3.1 to 3.5; the short, blunt snout 3.5 to 3.8 in head; maxillary 2.9 to 3.1, ending posteriorly to almost the front edge of pupil. Mouth very oblique, jaws about equal; front teeth of lower jaw strong and conical and a series of small ones behind them. Preorbital very narrow, its width at angle of mouth scarcely one-third the diameter of eye; suborbital adnate to cheek; opercle ending in a large flat spine.

All parts of head scaled. Fourth and last dorsal spines the highest. Soft dorsal and anal pointed along the middle, the former more or less produced into a filament; caudal deeply forked, armed superiorly and inferiorly at its base with three sharp and prominent spines.

Color in alcohol violet-brown, with a faint blackish spot on each scale; caudal peduncle and fin bright yellow, the line of demarcation between this color and that of body rather abrupt; dorsal, anal, and ventral fins dark violet-brown, and the posterior rays of the first two tipped with white; axil of pectoral dark; an irregular blackish blotch occupies the center of the middle caudal rays.

I have examined in the Bureau of Science collection fourteen specimens, 97 to 106 millimeters in length, obtained at the following localities: Monja Island, Corregidor; Hamilo, Batangas; Baco and Calapan, Mindoro; Sibuyan Island; New Washington, Capiz; and Bungau Island, Sulu Archipelago. The largest of these is a male, and the others are females in near-breeding condition, collected in March, 1926; April, 1922; July, 1925; and October, 1921.

This species, which is new to the Philippines, was originally described from Banda Neira by Bleeker. He recorded it also from Singapore, and Weber collected three specimens at Beo, Karakelang Island.

CHROMIS XANTHOCHIR Bleeker

Heliases xanthochir BLEEKER, Nat. Tijd. Ned. Ind. 2 (1851) 248;

GÜNTHER, Cat. Fishes 4 (1862) 62.

Chromis xanthochir BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877)

158; Atlas Ichth. 9 (1878) pl. 402, fig. 5.

Dorsal XII, 11; anal II, 10 or 11; scales in lateral series 26; with tubules 15 to 18; between lateral line and origin of dorsal 3; between lateral line and vent 9.

Dorsal and ventral profiles of the ovate body equally and evenly arched; greatest depth 2.2 to 2.5 in length; head 3.2 to 3.5; depth of caudal peduncle 6.6 to 7. Diameter of the large, round eye about equal to the width of the strongly convex interorbital, 2.8 to 3.2 in length of head; the short, slightly pointed snout 3.4 to 4, its tip on a line with center of pupil; maxillary 2.7 to 3, extending posteriorly well behind anterior margin of orbit. Width of preorbital at angle of mouth less than half diameter of eye. Teeth in front strong and conical; one or more series of small ones behind. Suborbital adnate to cheek; opercle with a flat spine behind.

Head and body completely scaled. Dorsal spines rather slender, the middle ones highest. Soft dorsal and anal highest along the middle, the former more pointed; caudal deeply cleft, with

the lobes produced and two accessory spines at base of each lobe free and sharp; both pectoral and ventral fins end at vent.

Greenish violet in alcohol, with silvery reflections which are more noticeable on lower portion of lateral surfaces; each scale with a dark edge; anterior dorsal and anal rays dusky, the posterior ones pale; dusky portion of caudal fin forming a broad, rather ill-defined longitudinal band on each lobe, middle rays pale; pectoral pale, ventral more or less washed with dusky; a blackish transverse band immediately behind preopercle and a yellowish violet spot at axil of pectoral.

Here described from ten specimens, 70.5 to 77 millimeters long, collected at Calapan, Mindoro; New Washington, Capiz; Bogó, Cebu; Placer, Surigao; and Sibutu Island, Sulu Archipelago. Six of these are females in a near-breeding state, collected in July, 1926, and September, 1925.

Apparently not common in the Philippines, this being the first record of the species here. It is known only from the East Indies.

CHROMIS SCOTOCHILOPTERUS Fowler

Chromis scotochilopterus FOWLER, Proc. Acad. Nat. Sci. Phila. 70 (1918) 61, fig. 24.

Dorsal XIII, 11; anal II, 11; scales in lateral series 26; with tubules 18; between lateral line and origin of dorsal 4; between lateral line and vent 9.

Body well compressed, contour ellipsoid; greatest depth at middle of belly, 2 in length; head 3.1 to 3.3; depth of caudal peduncle 6.3 to 6.8. Interorbital space strongly convex, rather wide, its width greater than length of snout or diameter of eye; snout rounded, shorter than the diameter of the large circular eye, which is 3.2 to 3.3 in head. Cleft of mouth very oblique; maxillary equal to or slightly longer than width of interorbital space, its posterior end below anterior edge of orbit; teeth short and conical, in two rows.

Scales completely covering head, also present on the dorsal fin. Middle dorsal spines higher than the rest, but much lower than the strong second anal spine. Soft dorsal and anal about equal in height; caudal deeply cleft, with the lobes more or less produced; the three anteriormost accessory spines on each caudal lobe sharp and prominent; outer ray of ventral produced into a filament, which extends beyond anal opening.

Ground color of fresh specimens uniformly dull violet brown, becoming slightly lighter on the lower parts. Spinous dorsal dark violet-brown, as were the anterior rays of the vertical fins, the rest yellowish; caudal with a well-defined upper and lower border of dark violet-brown, the rest of the fin yellowish; pectoral yellowish; ventrals lightly washed with violet-brown. A dark spot superiorly at base of pectoral. In alcohol the violet-brown color has become blackish brown and the yellowish color has disappeared.

Here described from thirteen specimens, 31 to 107 millimeters long, collected at Tagapula and Sayan Islands, Samar; Gigan-tangan Island, Leyte; New Washington, Capiz; and Tambagaan and Bungau Islands, Sulu Archipelago.

This species has been previously recorded by Fowler from specimens marked "Philippine Islands." Although it is closely allied to *Chromis xanthochir* Bleeker, it differs in having a narrower and more strongly defined dark band on each caudal lobe.

CHROMIS TERNATENSIS Bleeker

Heliases ternatensis BLEEKER, Nat. Tijds. Ned. Ind. 10 (1856) 377; GÜNTHER, Cat. Fishes 4 (1862) 63.

Chromis ternatensis BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 161; Atlas Ichth. 9 (1878) pl. 403, fig. 4; WEBER, Fische der Siboga Exped. (1913) 359.

Chromis philippinus FOWLER, Proc. Acad. Nat. Sci. Phila. 70 (1918) 63, fig. 25.

Dorsal XII, 10 or 11; anal II, 10 or 11; scales in lateral series 26; with tubules 16; between lateral line and origin of dorsal 3; between lateral line and vent 10.

Body deep and much compressed, deepest at base of ventrals, upper profile more elevated than the lower; depth of body 1.9 to 2 in length; head 3.2 to 3.4; depth of caudal peduncle 6.7 to 6.9. Diameter of the large, round eye 2.8 to 2.9 in length of head and equal to the width of the strongly arched interorbital or the length of the maxillary; snout short, 3.5 to 3.6 in head. Mouth strongly oblique, jaws even; two series of conical teeth in each jaw. Suborbital adnate to cheek and extremely narrow.

Head and body completely scaled; spinous dorsal also covered with scales. Of the dorsal spines, the middle ones the highest. Rayed dorsal slightly rounded and soft anal angular; caudal deeply notched, with the lobes more or less produced into filaments and with three well-developed spines at base of each lobe; ventral shorter than pectoral, its tip at origin of anal fin.

Fresh specimens brownish violet above, this color gradually fading into orange yellow below; the longitudinal stripe on each lobe of caudal brownish violet.

Ground color in alcohol brown, becoming darker on the back; each scale with a yellowish spot and dark edge; vertical fins violaceous; caudal with a dark blackish brown longitudinal stripe on each lobe. There is no bluish line in front of orbit.

The above account is of thirty-four specimens, 32 to 59 millimeters long, taken at Cabalian, Leyte; and at Tambagaan, Tawitawi, Sibutu, Bungau, and Siasi Islands, Sulu Archipelago. One of the examples, 37 millimeters in length, obtained in June, 1921, at Siasi, is in near-spawning condition.

This species has been recorded previously from the Philippines by Fowler, as *Chromis philippinus*.

I can find but little difference between *Chromis amboinensis* and this species, and it is probable that the former is an adult stage of *Chromis ternatensis*. It was first described by Bleeker from three specimens collected in Ternate. It is known to occur also in Goram; Booroo; and Beo, Karakelang Island.

CHROMIS DIMIDIATUS (Klunzinger)

PLATE 7, FIG. 2

Heliases dimidiatus KLUNZINGER, Fische des Rothen Meers 2 (1871) 529; GÜNTHER, Fische der Südsee 2 (1876) 237, pl. 125, fig. E.

Dorsal XII, 12; anal II, 12; scales in lateral series 26; with tubules 17; between lateral line and origin of dorsal 3; between lateral line and vent 9.

Depth of the ovoid body 2 in length; head 3.2, with the profiles evenly arched and equally elevated; depth of caudal peduncle 6.4, or 7.2 in length. The broad, evenly arched interorbital 2.8 in head; the large, circular eye 2.3; the short, rounded snout 4.1, or shorter than maxillary which is contained 3.5 in length of head. Cleft of mouth oblique, jaws even, the maxillary terminating posteriorly behind front edge of the eye's orbit; teeth in double series, those in front strong and conical. Preorbital very narrow, its width above angle of mouth less than one-third the eye diameter; opercle unarmed behind.

Head and body completely scaly; vertical fins with a rather high sheath of scales. Middle dorsal spines highest, the last one higher than the second anal spine. Both rayed dorsal and anal rounded; caudal forked, with the lobes produced into filaments; pectoral fin longer than head, terminating above base

of anal spine; outer ray of ventral produced into a filament, which extends to base of anterior anal rays.

Fresh specimen dark dusky brown; posterior half of the rayed dorsal, posterior third of soft anal, caudal peduncle, and caudal fin whitish, this coloration abruptly marked off from the ground color of body; ventrals and the rest of the vertical fins colored similarly to body; pectoral a little lighter and with a large black blotch at its base.

The coloration has not changed much in alcohol.

Here described from the only example present in the Bureau of Science, which measures 45 millimeters in length. It was collected by Herre at Bungau Island, Sulu Archipelago, and this is the first record of the species in the Philippines.

CHROMIS CAERULEUS (Cuvier and Valenciennes)

PLATE 8, FIG. 2

Heliases caeruleus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 372; BLEEKER, Nat. Tijd. Ned. Ind. 8 (1855) 455.

Chromis caeruleus JORDAN and SEALE, Bull. U. S. Bur. Fisheries 25 (1906) 290, pl. 44, fig. 1.

Heliases frenatus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 373.

Heliases lepisurus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 373.

Chromis lepisurus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 164; Atlas Ichth. 9 (1878) pl. 403, fig. 7.

Glyphisodon bandanensis BLEEKER, Nat. Tijd. Ned. Ind. 2 (1851) 248.

Heliases lepidurus GÜNTHER, Cat. Fishes 4 (1862) 63; Fische der Südsee 2 (1876) 238, pl. 128, figs. C and D; DAY, Fishes of India (1878) 389, pl. 82, fig. 1.

Chromis lepidurus WEBER, Fische der Siboga Exped. (1913) 358.

Dorsal XII, 9 or 10; anal II, 9 to 11; scales in lateral series 25; with tubules 14 to 16; between lateral line and origin of dorsal 2; between lateral line and vent 9.

Body ovate, profiles evenly curved from tip of snout to posterior portion of caudal peduncle, dorsal outline more strongly arched than ventral; depth of body 2 to 2.3 in length; head 2.9 to 3.3; depth of caudal peduncle 6.6 to 7.6. The strongly convex interorbital 2.7 to 3.3 in length of head; the circular eye 2.8 to 3.2; the slightly rounded snout 3.2 to 3.5, its tip on a level with lower margin of orbit; maxillary 2.2 to 2.6, being longer than width of interorbital, its posterior end below anterior margin of eye or slightly behind it. Mouth large, very oblique, jaws equal; teeth in two rows in each jaw, small and conical. Orbital ring narrow and adnate to cheek.

Head and body completely scaly; spinous dorsal naked. Dorsal spines decreasing in height posteriorly from the third, which is higher than the second anal. Soft dorsal and anal slightly rounded and of about the same height; caudal deeply cleft, with the lobes more or less produced and with the three anteriormost accessory spines on each margin of its base free and sharp. Pectoral and ventral fins of nearly the same length, the former extending to above anus and the latter with the outer ray produced into a filament which reaches to base of anal spines.

Ground color in life greenish, passing into silvery along belly; scales of head and sides with blue spots; caudal fin greenish and the other fins grayish; spinous dorsal having a narrow outer margin of blackish; pectoral with a blackish longitudinal stripe superiorly and a spot of similar color at its base and axil; iris golden.

Violet blue in alcohol with silvery luster all over, the ground color becoming lighter on the lower parts; each scale with a pale bluish spot; all the fins more or less washed with violet, spinous dorsal having a blackish outer edge; pectoral with a blackish axillary spot which extends over superiorly at base and with a blackish band along upper rays; caudal with upper and lower margins brownish; lips violet in front; a short bluish line in front of orbit.

Of this species I have examined in the Bureau of Science collection over one hundred specimens, the largest of which is 66 millimeters in length. It evidently breeds throughout the year, as several of them are ripe females, collected in different months. The specimens are from the following localities: Puerto Galera and Calapan, Mindoro; Bantayan Island; Cabalian, Leyte; Canigaran, Palawan; Surigao, Samal Island, and Zamboanga, Mindanao; and Tambagaan, Basbas, Bungau, Sibutu, and Sitankai Islands, Sulu Archipelago.

This species has been listed by Weber from Sanguisiapo, Sulu Archipelago, and is common from the Andamans, through the Indo-Australasian Archipelago, Micronesia, and the Carolines, to the South Seas.

Genus CHEILOPRION Weber

Cheiloprion WEBER, Fische der Siboga Exped. (1913) 342; *labiatus*.

Body ovate, compressed. Suborbital and the vertical margins of preopercle finely serrated. Teeth in two rows of uniform height, with slightly rounded tips. Lips thick and swollen, with outward radiating papillæ drawn together into visible furrows,

completely reversed outward all around the mouth uncovering the teeth. Scales 26 in longitudinal series; lateral line ending under the hind portion of the rayed dorsal; dorsal spines 13, scaly, with rounded and lobed membranes; head completely scaled excepting the lips, orbital ring, and the space between the nostrils and tip of snout.

This genus is distinguished from *Dichistodus* of Bleeker in having the two rows of teeth in each jaw of equal length, and from both *Dichistodus* and *Pomacentrus* in the strangely developed lips. It is known only from the Nicobars, Andamans, Philippines, and Karakelang Island, one of the Moluccas. It probably occurs throughout the intervening territory but has been overlooked by collectors, as it lives in the interstices of coral.

There is but a single species representing this genus.

CHEILOPRION LABIATUS (Day)

PLATE 9, FIG. 1

Pomacentrus labiatus DAY, Fishes of India (1878) 384, pl. 81, fig. 2, as *Pomacentrus labiosus*.

Cheiloprion labiatus WEBER, Fische der Siboga Exped. (1913) 342, fig. 73; FOWLER, Proc. Acad. Nat. Sci. Phila. 70 (1918) 53.

Dorsal XIII, 13; anal II, 13; scales in lateral series 26; with tubules 18; between lateral line and origin of dorsal 4; between lateral line and vent 10.

Body ovate, the outlines equally arched; depth 1.8 to 2 in length; head 2.6 to 2.8; depth of caudal peduncle 6.2 to 6.7. The wide, convex interorbital space 2.6 to 3 in length of head, wider than length of maxillary, which is greater than that of snout; the blunt snout 3.1 to 3.4 in head or about as long as diameter of eye; preorbital at angle of mouth less than half an eye diameter; maxillary extending posteriorly to a little before front edge of orbit. The extremely large and thick lips covered with outward radiating papillæ drawn together into distinct furrows, and completely turned back around mouth, thus exposing the teeth. Teeth in two rows of equal length in each jaw, minute, strongly compressed laterally, of uniform height, with slightly rounded tips. Suborbital bone and posterior margin of preopercle with fine denticulations.

Scales on top of head extending to nostrils, those at base of dorsal fin high; orbital ring naked. Middle and posterior dorsal spines about equal in height; soft dorsal pointed; rayed anal

a little rounded; ventrals extending to origin of anal; caudal slightly forked, with the lower lobe a little shorter than upper.

Blackish brown in alcohol, lighter on chest and opercular bones. Usually a bluish white spot is present on the center of each scale in the row above the lateral line, and some scattered bluish white spots on each side of head and on anterior portion of body below lateral line. All the fins have a deeper color than the body has.

Here described from eleven examples, 33 to 58 millimeters long, from Calapan, Mindoro; Canigaran, Palawan; and Sibutu Island, Sulu Archipelago. The only other record of this species from this country is that by Fowler, of two specimens labeled "Philippine Islands." It was originally described from the Andamans and Nicobars by Day, and later recorded from Beo, in Karakelang Island, by Weber. In his account of the fishes of the Siboga Expedition, Weber places the species under a separate genus, distinguished from any others by the enormously developed lips which are puffed out and covered with radiating papillæ.

Genus POMACENTRUS Lacépède

Pomacentrus LACÉPÈDE, Hist. Nat. Poiss. 4 (1803) 508; *pavo*.

Pristotis RÜPPELL, Neue Wirbelthiere, Fische (1838) 128; *cyano-stigma*.

Pseudopomacentrus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 40; *littoralis*.

Parapomacentrus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 65; *polynema*.

Amblypomacentrus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 68; *breviceps*.

Eupomacentrus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 73; *lividus*.

Brachypomacentrus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 73; *albifasciatus*.

Body compressed, oblong or ovate, with not more than 27 scales of moderate size in lateral series. Lateral line ending before posterior end of soft dorsal. Teeth in one or two series, compressed, entire or slightly emarginate. Dorsal fin continuous, even, with 12 to 14 spines. Only the vertical limb of the preopercle and generally the orbital bones serrated.

Species numerous; found about the coral reefs in the tropical seas of both hemispheres, but abundant in the Indian seas and in Polynesia.

Key to the Philippine species of Pomacentrus.

- a*¹. Dorsal spines 12.
 - b*¹. Scales on top of head stopping above the nostrils..... *P. lividus*.
 - b*². Scales on top of head extending almost to tip of snout.
 - c*¹. Body with a light crossband..... *P. albofasciatus*.
 - c*². Body without a light crossband..... *P. nigricans*.
- a*². Dorsal spines 13.
 - d*¹. Orbital ring smooth or indistinctly serrated.
 - e*¹. Teeth truncate.
 - f*¹. Orbital ring naked..... *P. pavo*.
 - f*². Orbital ring scaled.
 - g*¹. Vertical limb of preopercle scaled.
 - h*¹. Anal fin almost wholly dusky; dusky color on dorsal fin extending to fourth ray..... *P. violascens*.
 - h*². Anal fin entirely yellowish; dusky color on dorsal fin extending to second ray..... *P. bankieri*.
 - g*². Vertical limb of preopercle naked..... *P. taeniurus*.
 - e*². Teeth slightly rounded at tips..... *P. bifasciatus*.
 - d*². Orbitals distinctly serrated.
 - i*¹. Anterior denticulation of orbital enlarged and followed by a notch.
 - j*¹. Scales on top of head extending to tip of snout; vertical fins with a rather high basal sheath of scales.
 - k*¹. A large black spot at base of pectoral and another at axil of fin.
 - P. philippinus*.
 - k*². Base or axil of pectoral without any black spot.
 - l*¹. Teeth in double series; a very small black spot superiorly at axil of pectoral and another above operculum.
 - m*¹. Some bluish lines along forehead; bluish spots on opercles; caudal lobes slightly pointed..... *P. tropicus*.
 - m*². No bluish lines or spots on head; a light vertical streak on each scale; caudal lobes rounded..... *P. moluccensis*.
 - l*². Teeth in a single series; no black spots anywhere on body.
 - P. popei*.
 - j*². Scales on top of head not extending to tip of snout but stopping in front of nostrils; a low sheath of scales occupying base of vertical fins.
 - n*¹. Teeth in a single series.
 - p*¹. Axil of pectoral entirely black..... *P. alexandrae*.
 - p*². Axil of pectoral pale..... *P. grammorhynchus*.
 - n*². Teeth in double series.
 - q*¹. Body oblong, rather elongate..... *P. elongatus*.
 - q*². Body ovate, not elongate.
 - r*¹. Caudal fin yellow, this coloration abruptly marked from the ground color..... *P. dorsalis*.
 - r*². Caudal fin yellow, this color gradually merging in the ground color.
 - s*¹. A black spot on top of caudal peduncle.... *P. tripunctatus*.
 - s*². No black spot on top of caudal peduncle.
 - t*¹. Anus black..... *P. amboinensis*.
 - t*². Anus not black..... *P. simsiang*.

1. Orbital ring evenly serrated.

*u*¹. Inferior limb of preopercle scaly; scales on top of head extending to before front edge of eye.

*v*¹. Body with dark or white marks.

*w*¹. Body with white spot or band.

*x*¹. Body with a large white round spot along back but without any dorsal ocellus..... *P. chrysopoecilus*.

*x*². Body with a white transverse band and a dark ocellus.
P. notophthalmus.

*w*². Body with dark blotches.

*y*¹. Body with two wide dark blotches and a large blackish violet spot on axil of pectoral..... *P. prosopotaenia*.

*y*². Body with three dark blotches but without any axillary spot on pectoral..... *P. trimaculatus*.

*v*². Body without dark or white marks..... *P. melanochir*.

*u*². Inferior limb of preopercle naked; scales on top of head extending to above front rim of eye.

*z*¹. Body with yellow crossbands; teeth in double series, those on outer row neither contiguous nor truncate *P. fasciatus*.

*z*². Body with dark crossbands; teeth in a single series, closely set and more or less truncate..... *P. breviceps*.
P. ovoides.

*a*³. Dorsal spines 14.

*aa*¹. Teeth with emarginate edges; body with a series of white transverse lines *P. albolineatus*.

*aa*². Teeth with rounded edges; body without a series of white transverse lines.

*bb*¹. Pectoral with a rather large black spot covering almost entirely its base; anal uniformly deep brown..... *P. opisthostigma*.

*bb*². Pectoral with a small black spot superiorly at its base and axil; posterior third of anal black and the remaining portion whitish or whitish violet..... *P. tablasensis*.

POMACENTRUS LIVIDUS (Forster)

Chaetodon lividus FORSTER, Des. Anim. Licht. (1844) 227.

Eupomacentrus lividus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 73; Atlas Ichth. 9 (1878) pl. 403, fig. 5.

Pomacentrus lividus GÜNTHER, Fische der Südsee 2 (1876) 228, pl. 124, fig. F; JORDAN and SEALE, Bull. U. S. Bur. Fisheries 25 (1906) 283; WEBER, Fische der Siboga Exped. (1913) 340.

Pomacentrus cyanospilus MEYER, Ann., Soc. España Hist. Nat. 14 (1885) 34.

Dorsal XII, 15 or 16; anal II, 12 to 14; scales in lateral series 25; with tubules 16 to 18; between lateral line and origin of dorsal 3; between lateral line and vent 10.

Body markedly oblong, dorsal profile deeper than ventral and more arched anteriorly than posteriorly; depth of body 2 to 2.1 in length; head 2.8 to 3; depth of caudal peduncle 5.7 to 7.3. The wide, evenly convex interorbital 2.7 to 3.4 in length of

head; diameter of the small, circular eye 3.3 to 4.3 or shorter than width of preorbital at angle of mouth in large specimens; the long, slightly pointed snout 2.5 to 3, longer than maxillary, which is contained 3.1 to 3.6 in head. Cleft of mouth oblique, jaws even, tip of snout more inferior than lower margin of eye; teeth in two rows, those in outer row short and having slightly emarginate edges. Lower edge of suborbital and posterior edge of preopercle strongly serrated; opercle armed behind with two sharp spines.

Head naked on snout in front of nostrils and on edges of preopercle; base of vertical fins with a high sheath of scales. The last three dorsal spines almost equal in height. Middle rays of the vertical fins produced into a point; caudal emarginate, with the lobes broad and rounded; pectoral rounded, its tip within two scales from the point above anus; outer ray of ventral filamentous, ending behind at anus.

Brown or violet-black in alcohol, with scattered dots on head and a whitish spot on each scale of trunk, the spots on trunk forming more or less longitudinal series. In many of the examples a large dusky blotch is present at base and axil of the soft dorsal fin, and in the very young it is in the form of an ocellus edged anteriorly with bluish white. Pectoral yellowish, having a dark axillary spot which is absent in some specimens; all the other fins dusky.

Here described from forty-two examples, 20.5 to 97 millimeters long, collected at Puerto Galera and Calapan, Mindoro; Bulan, Sorsogon; Canigaran, Palawan; and South Ubian, Sibutu, and Sitankai Islands, Sulu Archipelago. This species has been previously recorded in the Philippines by Jordan and Seale from Negros Island.

In all the specimens examined the number of dorsal spines is twelve. I have examined also in the Bureau of Science collection some examples obtained by Seale at Guam, which are much lighter in coloration than those from the Philippines.

This species occurs from the Red Sea and east coast of Africa throughout the tropical Indo-Pacific seas to the islands of the South Seas.

POMACENTRUS ALBOFASCIATUS Schlegel and Müller

PLATE 9, FIG. 2

Pomacentrus albofasciatus SCHLEGEL and MÜLLER, Overz. Amphi. Verh. Nat. Ges. Ned. Overz. Bezitt. (1839) 21; GÜNTHER, Cat. Fishes 4 (1862) 19; DAY, Fishes of India (1878) 384, pl. 80, fig. 9; JORDAN

and SEALE, Bull. U. S. Bur. Fisheries 25 (1906) 282; JORDAN and RICHARDSON, Bull. U. S. Bur. Fisheries 27 (1908) 262.

Eupomacentrus albofasciatus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 75; Atlas Ichth. 9 (1878) pl. 403, fig. 6.

Pomacentrus scolopsis GÜNTHER, Cat. Fishes 4 (1862) 26; Fische der Südsee 2 (1876) 227, pl. 125, figs. A and B.

Dorsal XII, 16; anal II, 12; scales in lateral series 28; with tubules 20; between lateral line and origin of dorsal 3; between lateral line and vent 9.

Body ovate, upper profile from origin of dorsal to snout an even curve, depth 2.1 in length; head 3; depth of caudal peduncle 6.3. Interorbital space slightly convex, its width equal to length of snout, which is 3.1 in head or slightly longer than diameter of round eye; snout rounded, with its tip on a level with inferior margin of eye; mouth oblique; maxillary ending posteriorly below front margin of orbit; teeth in two rows, with slightly emarginate edges. Orbital ring at end of maxillary nearly half as wide as the length of eye diameter; preopercle finely serrated; opercle with a flat blunt spine behind.

There are no scales on the outer edges of preopercle; a rather high sheath of scales at base of vertical fins. Posterior half of dorsal spines of nearly the same height. Soft dorsal and anal highest along the middle, the former rounded and the latter angular; caudal forked; pectoral not quite reaching vent; ventral extending to base of anal spines, its outer ray produced.

In alcohol the color is olive brown, with a light brown streak at the edge of each scale. The broad light vertical band across middle of body between the posterior dorsal spines and the anterior anal fin is rather distinct; the blue lines on sides of head absent; a large, oblong, black spot occupying base of last dorsal rays, and another one present superiorly at base of pectoral. Ventrals and vertical fins blackish; outer portion of caudal pale.

The above account is that of two specimens, in the Stanford University museum, collected by R. C. McGregor at Calayan Island, Cagayan Province, as recorded by Jordan and Richardson.

This species is rather rare in the Philippines and is found from the Andamans throughout the Indo-Australasian Archipelago to Palau Islands and Samoa.

POMACENTRUS NIGRICANS (Lacépède)

Holocentrus nigricans LACÉPÈDE, Hist. Nat. Poiss. 4 (1803) 332, 367.

Pomacentrus nigricans JORDAN and SEALE, Bull. U. S. Bur. Fisheries

25 (1906) 281; JORDAN and RICHARDSON, Bull. U. S. Bur. Fisheries 27 (1908) 262.

Pomacentrus scolopseus QUOY and GAIMARD, Voy. Uranie, Zool. 2 (1824) 398.

Dorsal XII, 17; anal II, 13; scales in lateral series 26; with tubules 21; between lateral line and origin of dorsal 3; between lateral line and vent 10.

Upper profile of head more strongly arched than the ventral; the deep compressed body 1.9 in length; head 3.2; depth of caudal peduncle 6.5. Interorbital space evenly convex, as wide as the length of snout, which is 3.1 in length of head; mouth small, almost horizontal; maxillary 3.6 in head or as long as diameter of eye, its posterior end below front edge of orbit. Teeth in a double series, truncate. Width of preorbital at posterior end of maxillary nearly equal to half diameter of eye; suborbital and preopercle evenly and strongly denticulate; opercle ending in a flat spine.

Scales completely cover head and body, those on orbital ring and snout well embedded in the skin; a very high sheath of scales covers base of vertical fins. Dorsal spines evenly graduated posteriorly, the last one the highest. Rayed dorsal and anal rounded; caudal with the lobes rounded; pectoral short, not reaching vent; outer ray of ventral prolonged into a filament, which extends to base of anal spines.

Blackish brown in alcohol; a large black spot at base of last dorsal rays; a very distinct one superiorly at base of pectoral, extending into axil; a rather faint spot on most of the scales of body; an indistinct bluish streak on suborbital.

The above account is based upon a Samoan specimen, 98 millimeters long, which I examined at Stanford University Museum, there being no Philippine example available. Jordan and Richardson examined several specimens collected by McGregor at Calayan Island, Cagayan Province, and at Cagayancillo, Cagayan Islands.

This species appears to be close to *Pomacentrus lividus*, from which it is distinguished by a narrower preorbital and by the scaly orbital ring. It cannot be regarded as identical with *Pomacentrus albofasciatus*, because the latter has no scales on the inferior and posterior edges of preopercle. It is rather uncommon in the Philippines and is known to range from the Okinawa Islands throughout the Indo-Australasian Archipelago and the islands of the tropical Pacific to Polynesia.

POMACENTRUS PAVO (Bloch)

PLATE 10, FIG. 2

Chaetodon pavo BLOCH, Ichth. 6 (1787) 44, pl. 198, fig. 1.

Pomacentrus pavo LACÉPÈDE, Hist. Nat. Poiss. 4 (1803) 508; RÜPPELL, Fische des Rothen Meers (1828) 37; CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 310; GÜNTHER, Cat. Fishes 4 (1862) 23; Fische der Südsee 2 (1876) 227, pl. 124, fig. E; BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 42; Atlas Ichth. 9 (1878) pl. 408, fig. 9; JORDAN and SEALE, Bull. U. S. Bur. Fisheries 25 (1906) 279, pl. 40, fig. 1; WEBER, Fische der Siboga Exped. (1913) 336.

Pomacentrus pavo var. ? CARTIER, Verh. Phys. Med. Ges. Würzburg (1873) 99.

Dorsal XIII, 13 or 14; anal II, 13 to 15; scales in lateral series 26; with tubules 16 to 18; between lateral line and origin of dorsal 3; between lateral line and vent 9.

Body elongate, dorsal and ventral contours similar, being low even curves from tip of snout to caudal peduncle; depth 2.5 to 2.8 in length; head 3.2 to 3.5; depth of caudal peduncle 6.7 to 7.5. The convex interorbital 3.3 to 3.8 in length of head; diameter of the large, round eye 2.7 to 3.3 or longer than snout, which is contained 3.8 to 4 in head; maxillary 3 to 3.3 in head, extending posteriorly a little behind front edge of orbit. Cleft of mouth almost horizontal, lower jaw slightly in advance of upper; teeth in two rows, compressed and truncated. Pre-orbital very narrow, its width at posterior end of maxillary about a third of eye diameter; suborbital indistinctly denticulate; preopercle finely toothed at its hind margin; opercle with two flat spines behind.

Scales on top of head extend forward to a little distance behind nostrils; orbital ring naked. Dorsal spines increasing in height posteriorly. Dorsal and anal fins angular and about equal in height. Caudal emarginate, with the lobes slightly pointed; pectoral and ventral equal in length, both extending to anal opening.

Deep blue in alcohol, yellowish on belly and fins; each scale with a brownish vertical streak; belly and base of vertical fins with bluish dots. A large black spot above operculum; a smaller, one in axil of pectoral; two short dark bands in front of each eye, one across snout and the other on preorbital.

The foregoing account is taken from thirty examples, 17.5 to 52.5 millimeters long, collected at Calapan, Mindoro; Puerto Princesa, Palawan; Surigao and Cagayan de Misamis, Mindanao; and Sitankai Island, Sulu Archipelago. This fish un-

doubtedly spawns the year round, since a number of the above examples, collected in different months, were found to be in near-breeding condition.

Living specimens in the Bureau of Science aquarium, taken at Calapan, are deep blue, this color passing into bright lemon yellow on the underparts and on anal, caudal peduncle, and fin; first spine and outer edge of anal bluish black; outer edge of caudal fin grayish; posterior dorsal rays yellow; ventral fin yellow, its spine bluish violet; a black spot at origin of lateral line and another superiorly at base of pectoral.

Pomacentrus pavo var.? Cartier is probably this species.

This very handsome little fish is abundant in the Indo-Australasian Archipelago, and ranges from the Red Sea and the east coast of Africa to Polynesia.

POMACENTRUS VIOLASCENS Bleeker

Pristotis violascens BLEEKER, Contr. Ichth. Sumb. Journ. Ind. Arch. 2 (1848) 637.

Pomacentrus violascens BLEEKER, Nat. Tijd. Ned. Ind. 12 (1856) 222; GÜNTHER, Cat. Fishes 4 (1862) 20; BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 46; Atlas Ichth. 9 (1878) pl. 408, fig. 6.

Dascyllus xanthurus BLEEKER, Nat. Tijd. Ned. Ind. 4 (1853) 117.

Tetradrachmum xanthurus BLEEKER, Ned. Tijd. Dierk. 1 (1863) 250.

Dorsal XIII, 10 or 11; anal II, 10 or 11; scales in lateral series 26; with tubules 17 or 18; between lateral line and origin of dorsal 3; between lateral line and vent 9.

Body oblong and slightly elongate, its profiles equally elevated; depth of body 2.3 to 2.4 in length; head 3.1 to 3.3; depth of caudal peduncle 6.1 to 6.2. Interorbital space evenly arched, 3 to 3.2 in head; the large, round eye 3 to 3.6; snout shorter than maxillary, which is 2.8 to 3 in head. Mouth oblique, jaws even, tip of snout slightly higher than lower margin of orbit; teeth biserial, those in outer row truncate. Preorbital slightly notched in front; suborbital smooth; opercle with a large flat spine and two closely opposed small ones.

Head and body everywhere covered with scales. Dorsal spines increasing in height posteriorly. Middle rays of vertical fins and lobes of caudal more or less produced into filaments; pectoral fin extending to anus, and ventral at origin of anal fin.

Violet-brown in alcohol, with a bluish vertical streak on each scale; dorsal fin darker than ground color to fourth ray, the remaining portion yellow; anal entirely dusky or with the last rays yellowish; caudal peduncle yellow posteriorly, the fin simi-

larly colored, with the upper and the lower edges partly or entirely dusky. A bluish spot in axil of pectoral and another one at origin of lateral line.

I have examined five specimens in the Bureau of Science collection, measuring 38 to 53.5 millimeters long, from Siaton, Oriental Negros, and Cagayan de Misamis, Mindanao. I have also examined an example from Siquijor, which is now in the museum of Stanford University. There is an example, 58 millimeters long, from Hongkong in the Bureau of Science collection.

This species is very close to *Pomacentrus taeniurus*, but is easily distinguished by the yellow area on the tail, by the ill-defined dusky band on each caudal lobe, and by the scaly edges of the preopercle. It is apparently not very abundant in the Philippines, and is common only in the Indo-Australasian Archipelago from Sumatra to Ceram.

POMACENTRUS BANKIERI (Richardson)

Glyphisodon bankieri RICHARDSON, Ichth. China (1846) 253; GÜNTHER, Cat. Fishes 4 (1862) 54.

Parapomacentrus bankieri BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 67; Atlas Ichth. 9 (1878) pl. 408, fig. 8.

Abudefduf bankieri EVERMANN and SEALE, Bull. U. S. Bur. Fisheries 26 (1907) 92.

Dorsal XIII, 10 or 11; anal II, 11; scales in lateral series 26; with tubules 15 to 18; between lateral line and origin of dorsal 3; between lateral line and vent 9.

Body oblong, rather elongate, depth 2.4 to 2.7 in length; head 3.1 to 3.5; depth of caudal peduncle 6.1 to 6.7. Interorbital space strongly convex, 3 to 3.2 in length of head; the large, round eye 2.8 to 3.4; the short, rounded snout 3.5 to 4.3; maxillary 2.6 to 3. Mouth almost vertical, lower jaw slightly in advance of upper; a single series of distinctly notched teeth on each jaw. Preorbital very narrow; vertical edge of preopercle indistinctly serrated.

Head and body completely scaled. Dorsal spines slender, increasing in height toward behind. Soft dorsal and anal angular; caudal deeply forked, the longest rays of each lobe filamentous; outer ray of ventral fin produced into a filament, which extends to origin of anal fin.

Brownish violet in alcohol; head, back, and caudal peduncle with round bluish spots; each scale on the lower parts of body with a bluish vertical streak; dorsal fin dusky to the second ray, the remaining portion yellowish; caudal yellowish, with the upper and lower rays partly dusky; the other fins yellowish, a large

blackish spot at origin of lateral line, a second one at axil of pectoral, and a third, small spot superiorly at base of pectoral.

Here described from eight specimens, 19 to 53.5 millimeters long, from Bacon, Sorsogon; Larena, Siquijor Island; and Cagayan de Misamis, Mindanao. The example from Bacon has already been recorded by Evermann and Seale.

Günther places this species under the genus *Glyphisodon*, but in the five examples cited above there is a weakly developed denticulation along the angle of the preopercle.

This species is evidently not common in the Philippines, though it occurs from the coast of China throughout the East Indies to New Guinea.

POMACENTRUS TAENIURUS Bleeker

Pomacentrus taeniurus BLEEKER, Act. Soc. Sci. Ind. Neerl. 1 (1856) 51; GÜNTHER, Cat. Fishes 4 (1862) 22; var., CARTIER, Verh. Phys. Med. Ges. Würzburg (1873) 100; BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 47; Atlas Ichth. 9 (1878) pl. 408, fig. 2; EVERMANN and SEALE, Bull. U. S. Bur. Fisheries 26 (1907) 89.

Dorsal XIII, 10 or 11; anal II, 10 or 11; scales in lateral series 26; with tubules 16 to 18; between lateral line and origin of dorsal 3 or 4; between lateral line and vent 9.

Body oblong, rather elongate; depth 2.4 to 2.7 in length; head 3.3 to 3.4; depth of caudal peduncle 6.3 to 6.9. The strongly convex interorbital 2.9 to 3.2 in length of head; the large circular eye 2.8 to 3.3; snout 3.4 to 3.9, or shorter than maxillary, which is contained 2.7 to 3.1 in head. Mouth small and oblique; posterior end of maxillary below anterior border of eye; teeth in two rows, their edges truncate. Preorbital with a shallow notch anteriorly, its width at posterior end of maxillary less than half diameter of eye; lower edge of suborbital not serrated; the vertical limb of preopercle finely denticulated; opercle armed behind with two flat spines.

Head completely scaled excepting posterior limb of preopercle. Dorsal spines increasing in height toward behind. Middle rays of soft dorsal and posterior rays of soft anal filamentous; caudal deeply forked, the longest rays of each lobe filamentous. The short pectoral ends before anal opening, and the filamentous ray of ventral extends to base of anal spines.

Color in alcohol violet-brown, with a pearl-colored spot on each scale. A large dark spot above gill opening and a smaller one superiorly at base and axil of pectoral. Membranes of spinous dorsal narrowly edged with brown; pectoral and poste-

rior portion of dorsal and anal yellowish; caudal with a distinct dark violet stripe on each lobe, the middle rays yellowish.

Here described from eighteen specimens, 29.5 to 67 millimeters long, from Buguey, Cagayan Province; Guinobatan, Masbate; Culion Island; Tacloban, Leyte; Bantayan Island; Malampaya Sound and Puerto Princesa, Palawan; and Tambagaan and Bungau Islands, Sulu Archipelago. The species has been previously recorded by Cartier from two specimens taken in Ubay, Bohol; by Bleeker and by Evermann and Seale from specimens labeled "Philippine Islands." The lone specimen from Bantayan is now in the museum of Stanford University.

In the absence of scales on the vertical edge of preopercle and of the yellow color on the posterior portion of the tail, this species differs from *Pomacentrus violascens* Bleeker, which it resembles closely.

It is well distributed in the Indo-Australasian Archipelago. Elsewhere it is known from Faté and Tahiti.

POMACENTRUS BIFASCIATUS Bleeker

Pomacentrus bifasciatus BLEEKER, Nat. Tijds. Ned. Ind. 6 (1854) 330; GÜNTHER, Cat. Fishes 4 (1862) 18; Fische der Südsee 2 (1876) 226; DAY, Fishes of India (1878) 383.

Dichistodus bifasciatus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 88; Atlas Ichth. 9 (1878) pl. 401, fig. 3.

Dorsal XIII, 13; anal II, 13; scales in lateral series 25; with tubules 16; between lateral line and origin of dorsal 4; between lateral line and vent 10.

Body oblong, 2 in length; head 3; depth of caudal peduncle 5.8. Interorbital space very slightly convex, its width 3 in length of head, or equal to length of maxillary; diameter of eye as long as snout, which is 3 in head. Jaws equal, the cleft of the small mouth oblique, maxillary extending posteriorly to below anterior edge of orbit; teeth biserial, compressed, with slightly rounded tips. Preorbital above angle of mouth less than half diameter of eye; edges of preorbital and suborbital smooth; preopercle denticulated behind.

No scales on snout, orbital ring, and vertical limb of preopercle. Middle dorsal spines higher than posterior ones. Soft portion of dorsal and anal slightly pointed; caudal a little emarginate, with the lobes rounded; tip of pectoral above anus, ventral reaching origin of anal fin.

Ground color yellowish brown, with two large black crossbands, one of which descends from front of spinous dorsal to

opercles, and the other covers posterior dorsal spines and fades out below lateral line. Each side of head with traces of some bluish lines; all the fins yellowish.

Here described from a small specimen, 32 millimeters long, taken at Culion Island.

This is the first Philippine record of this species, which is known to occur elsewhere from the Andamans throughout the Indo-Australasian Archipelago to the Marshall Islands.

POMACENTRUS PHILIPPINUS Evermann and Seale

PLATE 3, FIG. 2

Pomacentrus philippinus EVERMANN and SEALE, Bull. U. S. Bur. Fisheries 26 (1907) 91, fig. 18.

Dorsal XIII, 13 or 14; anal II, 12 to 14; scales in lateral series 26; with tubules 17 or 18; between lateral line and origin of dorsal 3 or 4; between lateral line and vent 10.

Body ovate, dorsal and ventral outlines similar and evenly arched, depth 2 to 2.1 in length; head 3.5 to 3.6; depth of caudal peduncle 6.3 to 6.8. The width of the strongly arched interorbital 2.7 to 2.8 in length of head, slightly exceeding eye diameter, which is 2.9 to 3 in head; snout contained 3.3 to 4.3 in head; maxillary 3.2 to 3.3, ending posteriorly below anterior margin of orbit or a little beyond it. Mouth oblique, jaws even, tip of snout on a level with lower margin of eye; each jaw with a series of very small teeth. Suborbital coarsely serrated, the anterior denticulation appearing to be enlarged; opercle with two flat spines behind, the upper one of which is scarcely noticeable.

Scales on top of head extending to tip of snout; orbitals and rest of head scaly, both dorsal and anal fins having a high sheath of scales at base. Dorsal spines increasing in height posteriorly. Soft vertical fins slightly rounded; caudal emarginate; both pectoral and ventral fins extending to vent.

Fresh specimens blackish violet, with a yellowish vertical streak on each scale; caudal fin yellow toward base and posterior rays of vertical fins similarly colored; a large black spot at outer and inner base of pectoral, and a large yellow area at axil.

An old alcoholic specimen purplish brown, with a light vertical streak on each scale; vertical fins blackish excepting the posterior rays, which are abruptly yellowish; ventrals also blackish, the rest of the fins dusky; pectoral with a large black spot entirely covering inner base, and a yellow area at axil.

I described this species from a cotype, 50 millimeters long, from Bacon, Sorsogon, which is in the museum at Stanford University, and from five other specimens, 60 to 68 millimeters long, collected September, 1925, at Bogo, Cebu, one of which is a female about ready to spawn. The type specimen is in the United States National Museum.

POMACENTRUS TROPICUS Seale

PLATE 4, FIG. 2

Pomacentrus tropicus SEALE, Philip. Journ. Sci. § A 4 (1909) 517, pl. 12, fig. 1.

Dorsal XIII, 14; anal II, 14; scales in lateral series 25; with tubules 17; between lateral line and origin of dorsal 3; between lateral line and vent 9.

Body oblong, its greatest depth at origin of ventrals, 2 to 2.2 in length; head 3.1 to 3.3; depth of caudal peduncle 6.3 to 6.6. Interorbital space convex, contained from 2.6 to 2.8 in length of head; the diameter of the large, round eye 2.8 to 3.1, or equal to length of maxillary; snout slightly pointed and a little shorter than maxillary, its tip a little below the horizontal line passing through lower margin of orbit. Mouth almost horizontal, jaws equal, maxillary terminating posteriorly below front edge of eye; teeth in a double series, with rounded tips. Suborbital ring and preopercle strongly serrated, the former with the anterior denticulation enlarged and followed by a cleft; opercle with two flat spines behind.

Scales on top of head extending to tip of snout; suborbital naked; base of vertical fins with a high sheath of scales. Dorsal spines increase in height posteriorly. Soft dorsal and anal slightly pointed; caudal slightly emarginate, with the lobes pointed; both pectoral and ventrals extending past vent, the latter with the outer ray filamentous.

Colors of fresh specimens are as follows: Top of head from tip of snout to base of spinous dorsal blackish; eye above edge of pupil also blackish, and rest of body bright orange yellow. Two short pearl white lines in front of each eye, another one on suborbital, and a few spots similarly colored on opercles. A black spot on shoulder, and a smaller one superiorly at base of pectoral; a pearl white line from each side of belly to anal fin. Outer edge of anterior anal rays and of spinous dorsal black; anus black.

Almost uniform brownish yellow in alcohol, with whitish spots on opercles and cheeks, two short bluish lines in front of eyes, and an indistinct bluish stripe extending into anal rays from each side of belly; a black dot present above opercle, and a smaller one superiorly at axil of pectoral. All the fins yellowish; ventral, anal, and spinous dorsal tipped with dusky.

Here described from eight examples, 16 to 69 millimeters long, from Sialat Point, Catanduanes Island; Cebu, Cebu; and Tambagaan, Sibutu, and Sitankai Islands, Sulu Archipelago. The largest one, collected by Seale and Canonizado at Sitankai, is the type specimen, No. 4737, now in the Bureau of Science collection.

Contrary to Seale's account, this species has two rows of teeth.

POMACENTRUS MOLUCCENSIS Bleeker

Pomacentrus moluccensis BLEEKER, Nat. Tijds. Ned. Ind. 4 (1853) 118; GÜNTHER, Cat. Fishes 4 (1862) 30; BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 56; Atlas Ichth. 9 (1878) pl. 402, fig. 3; EVERMANN and SEALE, Bull. U. S. Bur. Fisheries 26 (1907) 89; WEBER, Fische der Siboga Exped. (1913) 337.

Pomacentrus hebardi FOWLER, Proc. Acad. Nat. Sci. Phila. 70 (1918) 46, fig. 18.

Dorsal XIII, 14; anal II, 13; scales in lateral series 25; with tubules 18; between lateral line and origin of dorsal 3; between lateral line and vent 10.

Body ovate, its depth 2.1 in length; head 2.9; depth of caudal peduncle 6.7. The convex interorbital space 4 in head, as wide as diameter of eye or length of snout. Mouth oblique; jaws equal; the maxillary, which is shorter than eye, ends posteriorly below anterior edge of orbit; teeth in each jaw in two series, with the edges slightly rounded. Anteriormost tooth of suborbital enlarged and followed by a notch; opercle with two flat spines behind.

Only the orbital ring and posterior limb of preopercle naked; scales on top of head extending almost to tip of snout. Hind dorsal spines highest. Rayed dorsal more pointed than anal; lobes of the emarginate caudal fin rounded; pectoral and ventral extending beyond anal opening.

Yellowish brown in alcohol, with a light narrow vertical streak on most of the scales; a small brown spot above opercle and another one superiorly at base of pectoral; the light longitudinal line on anal fin has undoubtedly faded out.

Here described from a single specimen, 35 millimeters long, from Bantayan Island. This species has been recorded formerly

from Bacon, Sorsogon, by Evermann and Seale; and an example from the "Philippine Islands" has been described by Fowler as *Pomacentrus hebardii*.

It is rather uncommon in the Indo-Australasian Archipelago, where it is known to occur.

POMACENTRUS POPEI Evermann and Seale

PLATE 11, FIG. 2

Pomacentrus popei EVERMANN and SEALE, Bull. U. S. Bur. Fisheries
26 (1907) 90, fig. 16.

Dorsal XIII, 14 or 15; anal II, 14; scales in lateral series 25 or 26; with tubules 18; between lateral line and origin of dorsal 3; between lateral line and vent 9.

Body deep, 1.9 to 2 in length; head 3 to 3.1; depth of caudal peduncle 6.4 to 6.8. Interorbital convex, 2.9 to 3 in head; snout 3.2 to 3.4 or about as long as maxillary, with the tip horizontally in front of lower margin of orbit; eye 2.6 to 3.2. Jaws equal in length, their posterior ends vertically below front edge of eye; teeth blunt and compressed, in a single series. Suborbital serrated, the first tooth enlarged and followed by a notch; opercle with a flat weak spine behind.

Preorbital and suborbital bones naked; scales on top of head extending to tip of snout; vertical fins with a high sheath of scales along base. Posterior dorsal spines highest, about as high as second anal spine. Soft dorsal more angular than soft anal; caudal emarginate, with the upper and lower lobes equal in length; pectoral and ventral reaching vent, the first ray of the latter more or less produced.

Uniformly yellowish in spirits, with a faint dusky margin on spinous dorsal and soft anal.

The Bureau of Science collection has two specimens, 37.5 and 48 millimeters long, which are here described. They are from Surigao and Cagayan de Misamis, Mindanao. The larger one, from the latter place, is a ripe female, collected in September, 1907.

This species was originally described by Evermann and Seale from the type specimen, No. 55903, from Bacon, Sorsogon, which is now in the United States National Museum.

POMACENTRUS ALEXANDERAE Evermann and Seale

Pomacentrus alexanderae EVERMANN and SEALE, Bull. U. S. Bur. Fisheries 26 (1907) 90, fig. 17.

Dorsal XIII, 13 or 14; anal II, 13 or 14; scales in lateral series 26; with tubules 16 to 19; between lateral line and origin of dorsal 4; between lateral line and vent 10.

Anterior profile rounded, body oblong, depth 1.9 to 2 in length; head 3 to 3.4; depth of caudal peduncle 6.4 to 6.7. Interorbital space strongly convex, 2.8 to 3 in length of head; snout and maxillary about equal in length, each slightly shorter than diameter of eye, which is 2.6 to 3.3 in head. Mouth small, slightly oblique; jaws equal; maxillary ending posteriorly below anterior margin of orbit; teeth in a single row in each jaw. Orbital ring above angle of mouth less than half diameter of eye, its outer edge denticulated, the first tooth enlarged and separated from the rest by a notch; opercle with a single spine at its hind margin.

Orbital ring naked; scales on top of head extending to nostrils. Dorsal spines increasing in height posteriorly, the last one as high as second anal spine. Soft dorsal and anal angular, about equal in height; pectoral and ventral of the same length, both extending to origin of anal; caudal emarginate, the lobes pointed.

Ground color in alcohol blackish brown, lighter on the lower parts; pectoral fin whitish with a large black spot completely covering its base and axil; the rest of the fins colored similarly as body; spinous dorsal with a black margin.

Of this species I have examined in the Bureau of Science collection fourteen specimens, 47 to 78 millimeters long, from Cabalian, Leyte; and Tambagaan, Bungau, Sibutu, and Sitankai Islands, Sulu Archipelago; also a cotype, 61 millimeters long, collected by C. J. Pierson at Bacon, Sorsogon. The smallest of the specimens, taken at Cabalian in May, 1921, is a female in near-breeding condition.

I have also examined another cotype of this species in the museum of Stanford University. Of the other cotypes there is one each at the Philadelphia Academy of National Sciences Museum, the United States National Museum, and the Indiana University Museum. The type, No. 55919, is in the United States National Museum.

POMACENTRUS GRAMMORHYNCHUS Fowler

Pomacentrus grammorhynchus FOWLER, Proc. Acad. Nat. Sci. Phila. 70 (1918) 44, fig. 17.

Head 3½; depth 1½; D. XIII, 15, I; A. II, 15, I; P. II, 16, II; V. I, 5; tubes in upper arch of lateral line 18, and pores in straight section to caudal base 9; 3 scales between spinous dorsal origin and lateral line,

and 10 below l.l. to spinous anal origin; 23 predorsal scales; head width $1\frac{1}{2}$ in its length; head depth about $1\frac{1}{4}$; snout 3; maxillary $3\frac{3}{4}$; interorbital $2\frac{1}{2}$; first dorsal spine nearly 4; thirteenth dorsal spine $1\frac{1}{2}$; eighth dorsal ray $1\frac{1}{2}$; second anal spine 2; sixth anal ray $1\frac{1}{2}$; least depth of caudal peduncle $1\frac{1}{4}$; ventral spine $1\frac{3}{4}$.

Body robust, compressed, contour rather deeply ellipsoid, with greatest depth well over median region, predorsal slightly trenchant just before dorsal, otherwise edges convex, and profiles alike. Caudal peduncle compressed, length $\frac{2}{3}$ its least depth.

Head robust, moderately compressed, sides moderately convex, upper profile at first convex, then concave at occipital and predorsal bulging distinctly convexly. Snout convex over surface and in profile, length half its width. Eye rounded, little elevated, and hind pupil edge nearly midway in head length. Mouth broad, gape short, oblique, and jaws about even. Lips fleshy, rather narrow. Maxillary extends slightly beyond nostril, though not nearly to eye, and slips below preorbital. Teeth rather slender, somewhat compressed, pointed, crowded close to form an even cutting-edge in a single row. No teeth on mouth roof or on tongue. Inner buccal folds broad. Tongue thick, fleshy, apparently free in front. Nostril small pore about midway in snout length. Interorbital evenly convex. Preorbital broad, width about $1\frac{1}{4}$ in eye, ends behind in broad posteriorly directed spine. Lower suborbital and hind preopercle edges serrate, serræ on latter graduated longer below, and lower preopercle edge entire. Opercle with 2 blunt and inconspicuous spines, upper concealed by scales.

Gill-opening forward about opposite front eye edge. Rakers $6 + 13$, lanceolate, about half length of filaments and latter $1\frac{1}{4}$ in eye. Pseudo-branchiæ long as gill-filaments. Branchiostegal membrane short fold over short and constricted isthmus.

Scales finely ctenoid, largest over middle of side of trunk and become much smaller all about edges, in lengthwise rows parallel with upper arch of lateral line. All larger scales narrowly imbricated. All fin bases scaly. Short scale between ventral bases about $\frac{1}{4}$ length of spine. Suprascapula with 3 blunt points. Exposure of humeral scale little larger than pupil. Axillary ventral scale broad, pointed, $\frac{1}{4}$ length of spine. Cheek with 3 rows of scales. Suborbitals, preorbital, snout edge, lips and chin naked. Upper arch of l.l. extends below front dorsal rays, concurrent with upper limit of squamation on dorsals. Tubes large, simple, and each extending well over scale exposure. Pores in straight section small, inconspicuous, simple or double irregularly, and not on caudal base.

Spinous dorsal origin about opposite that of pectoral, spines all more or less subequally high, edge of fin notched and slight cutaneous flap behind each spine tip. Soft dorsal inserted about last third in space between upper hind preopercle edge and caudal base, fin rounded with median rays longest. Anal inserted about midway between pectoral origin and caudal base, first spine about $\frac{2}{3}$ of second. Soft anal similar to soft dorsal. Caudal deeply emarginate, upper lobe much larger, $3\frac{3}{4}$ in combined head and trunk. Pectoral broad, about long as upper caudal lobe, reaches hind edge of vent and upper rays longest. Ventral inserted close behind pectoral base, reaches anal, and spine slightly over half length of fin.

Color in alcohol largely chocolate-brown above and posteriorly, head, breast and belly anteriorly paler or faded in appearance. Iris slaty.

Dorsals and anals blackish-brown. Caudal pale brownish. Pectoral brownish, with large blackish-brown blotch, nearly large as eye on base mostly above. Ventral blackish-brown, rays and spine pale. Dusky line from snout tip to eye.

Length 115 mm.

Type, No. 47,518, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

Allied with *P. melanopterus* Bleeker, but differs in the presence of the dark line from the eye to the snout.

An exact copy of Fowler's original description is reproduced above, there being no example of this species available for examination in the Bureau of Science collection.

POMACENTRUS ELONGATUS Seale

Pomacentrus elongatus SEALE, Philip. Journ. Sci. § A 4 (1909) 518, pl. 12, fig. 2.

Dorsal XIII, 13 or 14; anal II, 13 or 14; scales in lateral series 26; with tubules 18; between lateral line end origin of dorsal 4; between lateral line and vent 10.

Body elongate, dorsal outline evenly curved from tip of snout to caudal peduncle, ventral outline similar to dorsal; depth 2.2 to 2.3 in length; head 3.3 to 3.5; depth of caudal peduncle 6.7 to 7. Interorbital space convex, its width 3.1 to 3.3 in length of head; snout rounded, 3 to 3.1 in head or a little longer than maxillary, which is contained 3.3 in head; eye rather small, its diameter 3.8 in head. Mouth slightly oblique, jaws equal, posterior end of maxillary below anterior edge of orbit; two series of teeth in each jaw. Suborbital strongly denticulate, first tooth enlarged and followed by a wide shallow notch; opercle with two flat spines behind.

Scales on top of head extending to nostrils, leaving a naked space near tip of snout; orbital ring also naked; vertical fins with a rather high sheath of scales at base. Dorsal spines slender, becoming higher to the last; second anal spine higher than last dorsal. Soft vertical fins about equal in height, with their tips angular; caudal emarginate, with the lobes pointed; pectoral almost as long as head, its tip above vent; ventrals extending to origin of anal, its first ray filamentous.

Deep brown in alcohol, with a black spot above opercle, a bluish line above orbit, another one superiorly behind eye, a short one across preorbital, and several rather indistinct bluish spots on cheeks. Ventrals blackish, the other fins brownish.

The above description is that of an example, 83 millimeters long, from Tanjay, Oriental Negros, and of a type, 59 millimeters long, collected at Limbones Cove at the entrance to Manila Bay.

POMACENTRUS DORSALIS GILL

Pomacentrus dorsalis GILL, Proc. Acad. Nat. Sci. Phila. (1859) 147; GÜNTHER, Cat. Fishes 4 (1862) 29; SNYDER, Proc. U. S. Nat. Mus. 42 (1912) 504.

Pomacentrus emarginatus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 316; LESSON, Voy. Coquille, Zool. (1830) 189; Atlas Poissons (1826) pl. 28, fig. 1.

Pomacentrus chrysurus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 317; MEYER, Ann., Soc. España Hist. Nat. 14 (1885) 34.

Pomacentrus trilineatus BLEEKER, Atlas Ichth. 9 (1878) pl. 406, fig. 2.

Pomacentrus delurus JORDAN and SEALE, Proc. U. S. Nat. Mus. 28 (1905) 783.

Dorsal XIII, 14 or 15; anal II, 14 or 15; scales in lateral series 25; with tubules 17 or 18; between lateral line and origin of dorsal 3 or 4; between lateral line and vent 9 or 10.

Body ovate, dorsal profile of head slightly more arched than ventral; depth of body 2 in length; head 2.8 to 3.1; depth of caudal peduncle 6.3 to 6.7. Interorbital space evenly convex, 3.3 to 4 in length of head; snout short, 3.4 to 3.7, and shorter than either maxillary or diameter of eye, its tip on a level with lower margin of orbit; eye 2.6 to 3.5 in head; maxillary 2.9 to 3.5. Mouth small, jaws even, the posterior end of maxillary under or a little before front edge of eye; teeth biserial in each jaw. Orbital ring with the anterior denticulation enlarged and followed by a notch, its width at hind end of maxillary less than diameter of pupil; preopercle distinctly serrated.

A very narrow naked area near tip of snout; orbital ring and vertical limb of preopercle also naked. Dorsal spines increasing in height toward the last. Soft vertical fins slightly rounded; caudal emarginate; tip of pectoral a little before vent, ventrals extending beyond it.

Ground color varying from dusky green to yellowish brown in alcohol, with obscure light spots. In the young there is a large, blue-edged, black ocellus along the middle of the fourth to the eleventh dorsal ray. A distinct black spot at origin of lateral line but none on top of caudal peduncle. The small dark spot at base of pectoral has faded in many of the specimens. There is a short bluish streak in front of eye, and a longer one immediately below orbit. Anal and ventrals blackish; dorsal

fin colored similarly as body; caudal yellow toward base, this yellow area abruptly and sharply marked from the ground color.

Twenty-five examples, 42.5 to 53.5 millimeters long, have been examined, from Paraair, Balaoan, La Union; Puerto Galera and Calapan, Mindoro; Culion Island, Canigaran, and Balabac Island, Palawan; Surigao, Mindanao; and Sibutu and Sitankai Islands, Sulu Archipelago. Two specimens from Negros have been described by Jordan and Seale as *Pomacentrus delurus*.

This species is known elsewhere from Amboina, and the seas of China and Japan.

POMACENTRUS TRIPUNCTATUS Cuvier and Valenciennes

Pomacentrus tripunctatus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 315; GÜNTHER, Cat. Fishes 4 (1862) 33; JORDAN and SNYDER, Proc. U. S. Nat. Mus. 24 (1902) 604; EVERMANN and SEALE, Bull. U. S. Bur. Fisheries 26 (1907) 89; VAILLANT, Nouv. Arch. Mus. Hist. Nat. 5 (1893) 57.

Pomacentrus vanicolensis CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 316.

Pomacentrus littoralis CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 318; GÜNTHER, Cat. Fishes 4 (1862) 32; EVERMANN and SEALE, Bull. U. S. Bur. Fisheries 26 (1907) 89; JORDAN and RICHARDSON, Bull. U. S. Bur. Fisheries 27 (1908) 263.

Pomacentrus trilineatus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 321; GÜNTHER, Cat. Fishes 4 (1862) 25; BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 61 (in part); Atlas Ichth. 9 (1878) pl. 406, fig. 6; DAY, Fishes of India (1878) 382; JORDAN and SNYDER, Proc. U. S. Nat. Mus. 23 (1901) 753; WEBER, Fische der Siboga Exped. (1913) 337; AHL, Blätter der Aquarien- und Terrararien-kunde 36 (1925) with one text figure.

Pomacentrus biocellatus RÜPPELL, Neue Wirbelthiere, Fische (1835) 127, pl. 31, fig. 3.

Pomacentrus katunko BLEEKER, Nat. Tijds. Ned. Ind. 3 (1862) 169.

Pomacentrus punctatolineatus CARTIER, Verh. Phys. Med. Ges. Würzburg (1873) 98.

Pomacentrus dimidiatus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 63; Atlas Ichth. 9 (1878) pl. 406, fig. 8.

Dorsal XIII, 13 to 15; anal 13 to 16; scales in lateral series 25; with tubules 15 to 19; between lateral line and origin of dorsal 3 or 4; between lateral line and vent 10.

Body generally ovate, the form, however, varying with age; depth contained 1.9 to 2.1 in length; head 2.9 to 3.4; depth of caudal peduncle 6 to 6.9. Interorbital strongly convex, slightly narrower than length of snout and contained from 3 to 4.2 in head; snout rather rounded in very large individuals and slightly pointed in smaller ones, its length varying from 2.6 to 3.7 in length of head or slightly greater than diameter of

eye, which is contained 2.8 to 3.9 in head; mouth small, nearly horizontal; jaws even; maxillary ending posteriorly before front margin of orbit; teeth in two rows, with the tips slightly rounded. Orbital ring at angle of mouth slightly wider than half diameter of eye; anteriormost tooth of suborbital enlarged and followed by a notch; posterior edge of preopercle distinctly serrated.

Scales on head extend to nostrils, leaving a narrow naked space near tip of snout; no scales on orbital ring or on hind edge of preopercle. Dorsal spines evenly graduated toward the last, which is the highest. Pectoral shorter than ventral and not reaching vent; soft vertical fins slightly rounded; caudal distinctly emarginate.

Deep yellowish brown in alcohol, lighter behind and below; each scale in the young with one or more bluish dots, which become less distinct in the adult. Three black spots, one at origin of lateral line, another superiorly at base of pectoral, and the third on caudal peduncle, appear to be a distinctive character. In very large individuals the whitish spot immediately behind soft dorsal, which indicates the presence of the black spot on the tail, is absent. The ventral and vertical fins are usually darker, and the other fins lighter than the ground coloration. In the very young the bluish lines on top and sides of head are rather wide and are continued backward as a mass of spots toward a dark ocellus, which covers most of the posterior dorsal spines and anterior rays. In slightly older specimens the lines are narrower and some of the spots are absent, while the dorsal ocellus is reduced in size, sometimes occupying the anterior third of soft dorsal or covering the last one or more spines and a few anterior dorsal rays. In the next stages most of the blue spots are absent and there appears to be no connection between the ocellus and the lines. In a 45-millimeter example this ocellus is absent and the lines on the head, which gradually disappear with age, are very narrow.

I have examined in the Bureau of Science collection ninety-eight specimens, 23 to 100 millimeters long, from the following localities: Balaoan, La Union; Atimonan, Tayabas; Taal Lake; Puerto Galera and Calapan, Mindoro; Bacon, Sorsogon; Culion Island and Malampaya Sound, Palawan; Estancia, Panay; Borongan, Samar; Bantayan Island and Cebu, Cebu; Tagbilaran, Bohol; Siquijor, Siquijor Island; Cagayan de Misamis, Samal Island, and Zamboanga, Mindanao; and Sitankai Island, Sulu Archipelago. Thirteen specimens, 45 to 55 millimeters, from

Calapan, are ripe females; two, 55 and 61 millimeters, collected January, 1921, are ripe males; 3 from Puerto Galera, 54 to 57 millimeters, March to May, 1912, are ripe females. Four of the specimens from Malampaya Sound and Zamboanga, measuring from 67.5 to 100 millimeters in length, and taken in October, 1910, and June, 1925, respectively, are females about ready to spawn. It is also interesting to note that a ripe female, 65 millimeters long, was collected in February, 1922, at Lake Taal, which is a fresh-water lake.

This species has been recorded before in the Philippines from Bohol by Cartier; from Bacon by Evermann and Seale; from Cavite by Jordan and Seale and by Jordan and Richardson; and from Sanguisiapo, Sulu Archipelago, by Weber. The specimens constitute an interesting series and show every intermediate variety in form and color. The chief character, upon which this species is based, is the presence of three black spots; namely, one above the operculum, another on top of the tail, and a third on the anterior dorsal rays and partly on the posterior dorsal spines. *Pomacentrus dimidiatus* Bleeker, for example, represents a stage in this series in which the dorsal ocellus is small and confined to the last dorsal spine and the first two or three dorsal rays.

This species is very common in the Indo-Pacific regions from the Red Sea and the east coast of Africa to the South Sea islands.

POMACENTRUS AMBOINENSIS Bleeker

Pomacentrus amboinensis BLEEKER, Versl. Akad. Amsterdam 2 (1868) 334; Nat. Verh. Holl. Maats. Wet. 2 (1877) 58; Atlas Ichth. 9 (1878) pl. 406, fig. 7; WEBER, Fische der Siboga Exped. (1913) 339.

Dorsal XIII, 14 or 15; anal II, 14 or 15; scales in lateral series 26; with tubules 17 to 19; between lateral line and origin of dorsal 4; between lateral line and vent 10.

Body ovate and compressed, with upper and lower profiles about equally arched, depth 2.1 in length; head 3.2 to 3.3 in length of body; depth of caudal peduncle about twice in length of head or 6.5 to 6.7 in that of body. Interorbital space evenly convex, about as broad as length of maxillary, which is 3.1 to 3.3 in head; eye circular, superior, its diameter 2.9 to 3.2 in head; the short, bluntly rounded snout 3.2 to 3.5 in length of head; width of preorbital at posterior end of maxillary about a third of eye diameter. Mouth small and slightly oblique, jaws even; teeth in a double series, with slightly rounded edges; maxillary ending posteriorly below anterior edge of orbit; orbitals

serrated, with first tooth enlarged and followed by a notch; posterior edge of preopercle distinctly serrated; opercle with a flat spine behind.

Scales on top of head extending to in front of nostrils; orbital ring and vertical limb of preopercle naked. Dorsal spines increasing in height toward the last, which is 1.7 in head; second anal spine as high as last dorsal; the rayed portions of dorsal and anal fins slightly angular; caudal fin emarginate, with the upper lobe slightly the more produced; pectoral slightly shorter than head, its tip above anterior edge of anus; outer ray of ventral produced and reaching to behind anus.

Fresh specimens bright yellow in color, with pearl white spots scattered on each side of head and breast; a short pearl white line in front of each eye and a longer one just below it on suborbital; all the fins colored similarly to body; anal with two pearl white longitudinal lines; caudal and spinous portion of dorsal edged with blackish; a large black spot superiorly at base of pectoral and a smaller one at origin of lateral line; anus black.

Ground color yellowish brown in alcohol, the pearl white markings on head and breast becoming dull; the two white longitudinal lines on anal nearly faded out.

Here described from two specimens, 58 and 60 millimeters long, from Bantayan Island and from Sitankai Island, Sulu Archipelago.

This species, which is new to the Philippines, is known elsewhere only from Banda and Amboina.

POMACENTRUS SIMSIANG Bleeker

Pomacentrus simsiang BLEEKER, Nat. Tijds. Ned. Ind. 11 (1856) 90;

GÜNTHER, Cat. Fishes 4 (1862) 22.

Pomacentrus bankanensis GÜNTHER, Cat. Fishes 4 (1862) 26.

Pomacentrus trilineatus BLEEKER, Atlas Ichth. 9 (1878) pl. 406, figs. 1, 3, 4, and 5.

Pomacentrus taeniometopon BLEEKER, Nat. Tijds. Ned. Ind. 3 (1852) 283; GÜNTHER, Cat. Fishes 4 (1862) 25.

Pomacentrus burroughi FOWLER, Proc. Acad. Nat. Sci. Phila. 70 (1918) 44, fig. 17.

Dorsal XIII, 13 to 15; anal II, 13 to 15; scales in lateral series 25; with tubules 15 to 19; between lateral line and origin of dorsal 3; between lateral line and vent 10.

Body ovate, depth varying from 2 to 2.2 in length; depth of caudal peduncle equal to or slightly less than length of head, which is 2.9 to 3.3 in that of body. Eye round, diameter ranging

from 2.9 to 3.3 in head, larger in younger specimens, proportionately, than in older ones; interorbital space strongly convex, 3.2 to 3.7 in head; snout 3.1 to 4, with its tip on a level with lower margin of orbit; mouth small, maxillary ending posteriorly below front edge of eye and contained 3 to 3.5 in head. Teeth in a double series, with the tips rounded; orbital ring with the anteriormost serration enlarged and separated from the rest by a notch; width of preorbital at angle of mouth narrow, being slightly less than half an eye diameter; preopercle with distinct serrations behind.

The narrow area between tip of snout and nostrils naked; orbital ring and vertical limb of preopercle also unscaled. Dorsal spines gradually increasing in height posteriorly, the last one being higher than the second anal spine. The soft vertical fins slightly rounded; caudal slightly emarginate; pectoral extending to above anus; ventrals reaching origin of anal fin.

Yellowish green to yellowish brown in alcohol; caudal yellowish toward base, this yellow area not abruptly set off from the ground color; head with some bluish longitudinal lines along forehead; upper parts of body and sides of head with spots of similar color. There is a black spot above opercle and a light center on most of the scales of body. With the exception of the opercular spot, the above color markings become indistinct with age. The lines on head are continued in the form of spots toward the dark blue-edged ocellus along the dorsal fin. In the very young this ocellus is merely a large irregular dark blotch surrounded by numerous, more or less connected, bluish white spots, and covers a large portion of the rayed dorsal. In older specimens the ocellus is smaller and more regular in form, with a distinct ring around it. In some examples the ocellus is on the middle rays, in others it is slightly more anterior or posterior. There is a black spot superiorly at base of pectoral but none on top of caudal peduncle. Some examples have one or more light longitudinal lines along anal fin.

I have examined in the Bureau of Science collection over a hundred specimens, 22 to 69 millimeters long, coming from the following localities: Hundred Islands, Pangasinan; Limbones Cove, Batangas; Puerto Galera, Mindoro; Bacon, Sorsogon; Guinobatan, Masbate; Borongan, Samar; Estancia, Panay; Bantayan Island and Cebu, Cebu; Cabalian, Leyte; Tagbilaran, Bohol; Canigaran, Puerto Princesa, and Balabac Island, Palawan; and Siasi and Sitankai Islands, Sulu Archipelago. Two specimens from Balabac Island, measuring 46 and 49 millimeters

long, are ripe females; the larger specimen was collected in May, 1921, and the smaller one in September, 1925.

Fowler's *Pomacentrus burroughi* is evidently this species, which is separated from *Pomacentrus tripunctatus* Cuvier and Valenciennes by the absence of the black spot on the caudal peduncle.

This species is found throughout the East Indies, and ranges northward to the China Sea.

POMACENTRUS CHRYSOPOECILUS Schlegel and Müller

PLATE 11, FIG. 1

Pomacentrus chrysopoecilus SCHLEGEL and MÜLLER, Overz. Amphi. Verh. Nat. Ges. Ned. Overz. Bezitt. (1839) 21, pl. 5, fig. 3; BLEEKER, Nat. Tijds. Ned. Ind. 3 (1852) 284; GÜNTHER, Cat. Fishes 4 (1862) 20; MEYER, Ann., Soc. España Hist. Nat. 14 (1885) 34.

Dichistodus chrysopoecilus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 84; Atlas Ichth. 9 (1878) pl. 406, fig. 9.

Pomacentrus pristigir JORDAN and RICHARDSON, Bull. U. S. Bur. Fisheries 27 (1908) 263.

Dorsal XIII, 13 to 15; anal II, 13 or 14; scales in lateral series 26; with tubules 17 or 18; between lateral line and origin of dorsal 4; between lateral line and vent 10.

Body oblong, rather thick and elongate; dorsal profile deeper than ventral, more arched anteriorly; greatest depth of body 2.1 to 2.3 in length; head short, 3.2 to 3.4; depth of caudal peduncle 5.6 to 6.2. Snout long, slightly pointed, 2.5 to 2.9 in length of head, being longer than the width of the strongly arched interorbital, which is equal to or greater than length of maxillary; eye round, rather small, its diameter contained 3.6 to 4.5 in head, or shorter than maxillary. Mouth slightly oblique, its angle well in front of eye; tip of snout well below inferior margin of orbit; teeth compressed, slightly pointed, in a single series. Width of preorbital at posterior end of maxillary more than half diameter of eye; suborbital and preopercle strongly and evenly serrated; opercle with a single flat spine behind.

Scales on top of head advancing to front edge of orbit, leaving a naked space from there to tip of snout; the rest of head and body well covered with large ctenoid scales. Dorsal spines growing consecutively higher to the last, which is as high as second anal spine. Soft dorsal and anal rounded and about equal in height; caudal very slightly emarginate, the lower lobe shorter and more rounded than the upper; pectoral not quite reaching vent; ventral longer than pectoral, its tip at vent.

Color in alcohol dark brown, with a large white spot on the back between lateral line and base of seventh and eighth dorsal spines. A large black spot above operculum; a bluish transverse streak on each scale; a white line on suborbital. Ventral and anal blackish.

The above account is based upon fifty-one examples, 33 to 125 millimeters in length, coming from the following localities: Puerto Galera, Mindoro; Canigaran, Palawan; Tagbilaran, Bohol; Clarendon Bay, Balabac Island; Samal Island and Zamboanga, Mindanao; and Sibutu and Sitankai Islands, Sulu Archipelago.

Previously known in the Philippines from an example collected by A. B. Meyer in Cebu, and from another one recorded from Cuyo by Jordan and Richardson as *Pomacentrus pristigir*. According to the authors, the Cuyo specimen had the following life colors: Body dull dark-green; fins dark brown; a line under each eye and a spot in front of eye; some spots on top of head of a rich violet color; opercles faintly washed with violet.

This well-marked species is known only from the East Indies.

POMACENTRUS NOTOPHTHALMUS Bleeker

Pomacentrus notophthalmus BLEEKER, Nat. Tijd. Ned. Ind. 4 (1853) 137; Act. Soc. Sci. Ind. Neerl. 1 (1856) 51; GÜNTHER, Cat. Fishes 4 (1862) 20; JORDAN and SEALE, Bull. U. S. Bur. Fisheries 25 (1906) 280.

Dichistodus notophthalmus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 82; Atlas Ichth. 9 (1878) pl. 401, fig. 4, and pl. 402, fig. 4.

Pomacentrus suluensis SEALE, Philip. Journ. Sci. § A 4 (1909) 519.

Dorsal XIII, 13 to 15; anal II, 13 or 14, scales in lateral series 26; with tubules 17 or 18; between lateral line and origin of dorsal 4; between lateral line and vent 10.

Body ovate, dorsal outline slightly deeper than ventral; depth of body 2 in length; head 2.9 to 3; depth of caudal peduncle 5.7 to 6. Interorbital convex, 3.3 to 3.7 in length of head, about as wide as length of snout, which is contained 3.3 to 3.4 in head; eye round and fairly large, its diameter about as long as maxillary, which is contained 3 to 3.1 in head and ends posteriorly below anterior edge of orbit. Mouth oblique, jaws equal, tip of snout slightly pointed and on a level with inferior margin of eye; two rows of compressed and slightly pointed teeth in each jaw. Width of preorbital at angle of mouth almost equal to half the orbit's diameter; lower edge of orbital and vertical limb

of preopercle strongly serrated; opercle armed behind with two flat spines.

Area between nostrils and tip of snout naked; orbital and posterior edge of preopercle also naked. The middle dorsal spines highest. Soft vertical fins slightly rounded; caudal emarginate, with the lobes rounded; pectoral ending above anal opening, ventral extending beyond it.

Brownish in alcohol, with a pearl-colored vertical band descending below the third, fourth, and fifth dorsal spines, and with a second pearl white crossband through the soft vertical fins in very young examples. A large blackish blotch on the ninth, tenth, and eleventh dorsal spines near base. Spinous dorsal narrowly edged with black; ventral and anal dusky; the other fins yellowish. A dark round spot superiorly on opercle; a short bluish white line in front of eye and another immediately under orbit; pearly white dots scattered on cheek; an indistinct light spot or streak on each scale.

Here described from eight specimens, 21 to 38.5 millimeters long, coming from Cuyo; Samal Island, Mindanao; and Sibutu and Sitankai Islands, Sulu Archipelago. A careful examination of *Pomacentrus suluensis* Seale shows that it is only the young of the present species, with the serration of the suborbital still undeveloped.

This species is found in small numbers in the Indo-Australasian Archipelago and in the islands of the South Seas. Jordan and Seale have recorded it from the islands of Woodlark, Faté, and New Hebrides.

POMACENTRUS PROSOPOTAENIA Bleeker

Pomacentrus prosopotaenia BLEEKER, Nat. Tijds. Ned. Ind. 3 (1852) 67; GÜNTHER, Cat. Fishes 4 (1862) 23; FOWLER and BEAN, Proc. U. S. Nat. Mus. 62 (1922) 45.

Dichistodus prosopotaenia BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 80; Atlas Ichth. 9 (1878) pl. 407, fig. 8.

Pomacentrus n. sp. CARTIER, Verh. Phys. Med. Ges. Würzburg (1873) 100.

Dorsal XIII, 13 or 14; anal II, 13 or 14; scales in lateral series 25 or 26; with tubules 16 to 18; between lateral line and origin of dorsal 4; between lateral line and vent 10.

Body markedly oblong, upper profile of head steep and very slightly arched; depth 2 to 2.1 in length; head 3.3 to 3.4; depth of caudal peduncle 5.7 to 6.2. Interorbital strongly convex, 3.1 to 3.4 in length of head; snout long, slightly pointed, 2.6 to 2.8,

its tip away below the horizontal line passing through lower edge of orbit; maxillary short, 3.2 to 3.3, ending in front of eye; eye small and round, 3.4 to 4.2. Cleft of mouth almost horizontal, jaws even; width of preorbital at angle of mouth greater than half diameter of eye; teeth biserial, compressed, with slightly rounded tips. Suborbital and hind edge of preopercle strongly serrated; opercle terminating in a large flat spine.

Scales on head extend to the bluish line between the orbits, the area below and in front of this line naked; orbitals and inferior limb of preopercle also naked. Dorsal spines increasing gradually in height to the last. Rayed dorsal and anal fins angular; caudal fin emarginate, with the lobes rounded; pectoral and ventral about equal in length, both ending at vent.

Ground color in alcohol yellowish olive, dusky below the soft dorsal and on anterior half of body. Each scale with a bluish vertical streak; head, anterior portion of trunk, and base of vertical fins irregularly dotted with blue. A bluish white line in front and between eyes; another from orbit, convergent at snout; a third one across suborbital; one or two more or less broken lines on cheek; a small black spot above opercle. Axil of pectoral entirely blackish violet; anal tipped with grayish and provided with a bluish longitudinal line near margin.

The above description is based upon an examination of six fairly large specimens, 75 to 118.5 millimeters long, obtained at Bantayan Island and at Sitankai Island, Sulu Archipelago. The only previous Philippine records of this species are from Zamboanga by Fowler and Bean, and from Cebu by Cartier as *Pomacentrus* n. sp.

This species appears close to *Pomacentrus trimaculatus* Cuvier and Valenciennes, agreeing with it in the general form of the body and in some details of color pattern, but differing from it in having a slightly deeper body and a large black spot at the axil of the pectoral. With the exception of the broad dark band on the anterior half of the body, the examples above described agree with Bleeker's figure.

The species is known from the coast of Singapore throughout the East Indies to New Guinea.

POMACENTRUS TRIMACULATUS Cuvier and Valenciennes

PLATE 12, FIG. 2

Pomacentrus trimaculatus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 320; SCHLEGEL and MÜLLER, Overz. Amphi. Verh. Nat. Ges. Ind. Overz. Bezitt. (1839) 20, pl. 4, fig. 2; BLEEKER, Nat. Tijds. Ned. Ind. 4 (1853) 481; GÜNTHER, Cat. Fishes 4 (1862)

19; Fische der Südsee 2 (1876) 227; DAY, Fishes of India (1878) 382, pl. 80, fig. 10; JORDAN and SEALE, Bull. U. S. Bur. Fisheries 25 (1906) 280; EVERMANN and SEALE, Bull. U. S. Bur. Fisheries 26 (1907) 89.

Dichistodus trimaculatus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 79; Atlas Ichth. 9 (1878) pl. 404, fig. 5.

Dorsal XIII, 13 or 14; anal II, 13 or 14; scales in lateral series 26; with tubules 15 to 18; between lateral line and origin of dorsal 4; between lateral line and vent 10.

Body oblong, a little elongate, profiles similar; depth 2.1 to 2.3 in length; head 3.1 to 3.4; depth of caudal peduncle 5.5 to 6.1. Interorbital space strongly convex and moderately wide, being 3.2 to 3.8 in length of head or a little wider than the diameter of the small, round eye, which is contained 3.8 to 4.1 in head; snout long and slightly pointed, decidedly longer than either maxillary or diameter of orbit, being 2.5 to 2.9 in head, its tip below the horizontal line passing through inferior margin of eye. Mouth small, almost horizontal; maxillary 3.2 to 3.5 in head, ending posteriorly a trifle behind nostrils, teeth in a double series, compressed, with slightly rounded tips. Width of preorbital above posterior end of maxillary nearly equal to diameter of eye; suborbital and posterior edge of preopercle strongly and evenly serrated; opercle with a flat spine behind.

Snout in front of nostrils, orbital ring and vertical limb of preopercle bone naked. Dorsal spines evenly graduated to the last, which is as high as second anal spine. Rayed dorsal and anal slightly angular and of nearly the same height; ventral longer than pectoral, ending opposite vent.

Color in spirits yellowish, with three large blackish spots along back; one at origin of dorsal fin; the second below the seventh, eighth, ninth, and tenth spines; the third at the base of the last dorsal rays; the last two spots disappearing below lateral line. A light band on nape; two bluish lines across interorbital; another along suborbital, extending into more or less connected dots on preorbital; some scattered bluish spots on sides of head and on scales of vertical fins, and a narrow transverse streak of the same color on each scale of body. Anal with a longitudinal stripe along the middle, dorsal with two. A dark blotch surrounding vent and none on axil of pectoral.

The fourteen Bureau of Science specimens above described measure 41 to 120 millimeters in length, and were collected at Puerto Galera, Mindoro; Busuanga Island; Halsey Harbor, Cu-

lion Island; Cebu, Cebu; Tagbilaran, Bohol; Zamboanga, Mindanao; and South Ubian and Tango Islands, Sulu Archipelago. The species was first known in the Philippines from Bacon, Sorsogon, and from San Fabian, Pangasinan, as recorded by Evermann and Seale.

This species, easily recognized by the three large dark blotches on the upper parts of the body and by a large dark area around the vent, ranges from the Andamans eastward throughout the East Indies, New Guinea, and Micronesia, and northward to the coast of China.

POMACENTRUS MELANOCHIR Bleeker

PLATE 12, FIG. 1

Pomacentrus melanochir BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 49; Atlas Ichth. 9 (1878) pl. 408, fig. 4.

Dorsal XIII, 10; anal II, 14; scales in lateral series 26; with tubules 17; between lateral line and origin of dorsal 4; between lateral line and vent 9.

Body ovate-oblong, slightly elongate; profiles about evenly arched; depth 2.5 in length; head 3.4; depth of caudal peduncle 6.6. Interorbital space strongly arched, wide, 3.4 in length of head; maxillary as long as eye diameter, each equal to width of interorbital; snout short and rounded, 4 in head. Cleft of mouth very oblique, lower jaw projecting, maxillary ending posteriorly in front of orbit; teeth in two rows, compressed and truncate. Suborbital and posterior edge of preopercle strongly denticulate, the width of the former behind angle of mouth about a third of eye diameter; opercle armed behind with two flat, sharp spines.

Scales on head extending to nostrils; orbitals and edges of preopercle naked; dorsal and anal fins with a low sheath of scales at base. Dorsal spines increasing in height posteriorly, the last one higher than the second anal spine. Soft dorsal and anal about equal in height, forming posteriorly acute angles; caudal deeply forked, with the lobes pointed; ventral slightly longer than pectoral, the latter extending to base of anal spines.

Color in alcohol brownish violet, with a light vertical streak on each scale; vertical fins and ventrals blackish; spinous dorsal with darker margin; pectoral and caudal fins yellowish, the former a little paler and with a large blackish blotch covering its base and axil. There is an indistinct dark spot at origin of lateral line.

Described from a single specimen, 66 millimeters long, from Cabalian, Leyte, which is the first recorded from the Philippines. In the arrangement of scales on the head, in the general form of the body, and in color markings, this species is closely related to *Pomacentrus coelestis* Jordan and Starks, of Japan.

Known in the East Indies from Bali, Flores, Timor, Buro, and Amboina.

POMACENTRUS FASCIATUS Cuvier and Valenciennes

PLATE 13, FIG. 2

Pomacentrus fasciatus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 320, pl. 134; SCHLEGEL and MÜLLER, Overz. Amphi. Verh. Nat. Ges. Ned. Overz. Bezitt. (1839) 20, pl. 4, fig. 1; GÜNTHER, Cat. Fishes 4 (1862) 19; JORDAN and RICHARDSON, Bull. U. S. Bur. Fisheries 27 (1908) 263.

Dichistodus fasciatus GILL, Proc. Acad. Nat. Sci. Phila. (1863) 214; BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 86; Atlas Ichth. 9 (1878) pl. 401, fig. 8.

Dorsal XIII, 13 or 14; anal II, 13; scales in lateral series 26; with tubules 17 to 19; between lateral line and origin of dorsal 4; between lateral line and vent 10.

Upper and lower profiles of body similar, being regular curves from tip of snout to tail; depth 2.1 to 2.2 in length; head 3.1 to 3.4; depth of caudal peduncle 5.6 to 6.4. Interorbital space strongly arched, 3.1 to 3.4 in length of head; eye circular, rather small, its diameter 3.3 to 4.3, or shorter than the blunt, rounded snout, which is 2.8 to 3.4 in head. Mouth small, slightly oblique; maxillary 2.9 to 3.4 in head, its posterior end a little before eyes; tip of snout lower than inferior margin of orbit; teeth rounded, noncontiguous, in two series in each jaw. Suborbital coarsely denticulated, the width of preorbital at end of maxillary greater than two-thirds eye diameter; opercle armed behind with two flat spines.

Top of head scaly to front rim of orbit, leaving snout entirely naked; orbitals and edges of preopercle also naked. Dorsal spines increasing in height toward behind. Soft dorsal and anal rounded, of nearly the same height; caudal very slightly emarginate; pectoral ending before anus and ventrals extending to origin of anal fin.

Dark brown in alcohol, becoming lighter toward the lower parts, with four yellow crossbands; one on the nuchal region, the second from front part of dorsal fin to behind axil of pectoral, the third across posterior dorsal spines, the fourth at axil of soft dorsal. A black spot above operculum; two parallel

series of black specks along sides of body, originating from opercle between lateral line and base of pectoral; in some specimens a third series also present just below lateral line; the three series of spots absent in very young individuals. Pectoral dusky at base and yellowish outward; all the other fins dusky; most of the scales of body with a yellowish streak or spot. In some specimens there is a light longitudinal line on anal fin.

Described from twenty-three specimens, 21 to 111 millimeters in length, collected at the following localities: Paoay and Currimao, Ilocos Norte; Iba, Zambales; Polillo Island; Bantayan Island; Canigaran, Palawan; Balabac, Balabac Island; Canigao Island, Leyte; Zamboanga, Mindanao; and Tubigan, Jolo, Tawitawi, Bungau, Sibutu, and Saluag Islands, Sulu Archipelago. The example from Saluag Island, 111 millimeters in length, is a ripe female, collected in September, 1925.

I have examined several specimens at Stanford University Museum, from Bantayan, Canigao, and Bungau Islands. Günther listed an adult specimen from the "Philippine Islands;" Jordan and Richardson reported two specimens from Ticao Island; and Max Weber collected eleven from Sanguisiapo, Sulu Archipelago.

This fish, well marked by four yellow vertical bands on the head and body and by two or three longitudinal series of black spots on the sides, is evidently widespread in the Philippines. It occurs elsewhere in the East Indies from the coast of Singapore to the Moluccas.

POMACENTRUS BREVICEPS (Bleeker)

PLATE 13, FIG. 1

Amblypomacentrus breviceps BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 69; Atlas Ichth. 9 (1878) pl. 404, fig. 7.

Glyphidodon breviceps GÜNTHER, Cat. Fishes 4 (1862) 42.

Dorsal XIII, 10 or 11; anal II, 11 or 12; scales in lateral series 25; with tubules 15 to 17; between lateral line and origin of dorsal 3; between lateral line and vent 9.

Body oblong and elongate, deepest at base of first three dorsal spines, being 2.2 to 2.6 in length; head 3 to 3.6; depth of caudal peduncle 6.1 to 7. Interorbital narrow, slightly convex, 3.2 to 4.1 in length of head; eye fairly large, circular, 2.6 to 3; snout short and rounded, 3.5 to 4.9. Cleft of mouth almost vertical, lower jaw slightly projecting, maxillary terminating posteriorly behind anterior edge of eye and contained 2.8 to 3.4 in head; only one row of truncate and closely set teeth in each jaw. Preorbital

narrow, less than half an eye diameter at its widest part; sub-orbital and vertical limb of preopercle very finely serrated.

Scales absent on snout, chin, suborbital, and edges of preopercle; a low sheath of scales covering base of vertical fins. Dorsal spines increase in height to the fourth, the rest about equal in height. Fifth and sixth dorsal rays filamentous, as are also the seventh and eighth anal rays; caudal lobes ending in filaments; the short pectoral fin ending before anal opening; outer ray of ventral fin extending to base of anal spines.

Yellowish brown in alcohol, with a silvery reflection on each scale and three broad brown crossbands; the first descending from crown of head through orbit and preopercle, the second broader than the light space before it, under origin of dorsal fin and the first six dorsal spines; the third below the last three dorsal spines and the rayed portion of dorsal; a large dusky blotch on base of caudal; soft dorsal and caudal with numerous light specks, which assume a bandlike arrangement.

Of this species there are twenty-six specimens in the Bureau of Science collection, 21 to 50.5 millimeters in length, from the following localities: Subic and Olongapo, Zambales; Nasugbu, Batangas; Concepcion, Busuanga Island; Estancia, Panay; Bantayan Island and Cebu, Cebu; Cuyo and Puerto Princesa, Palawan; and Tagbilaran, Bohol. The above number includes fifteen ripe females, 28 to 50.5 millimeters long, collected January 13, 1924; May, 1907; and October 1, 1907. A number of specimens from Olongapo and Puerto Princesa are in the museum of Stanford University.

This species is recognizable by the three broad dark crossbands on the body. A comparison of Philippine specimens with those from Sandakan, Borneo, reveals no specific differences.

This fish is known only from the Indo-Australasian Archipelago.

POMACENTRUS OVOIDES Cartier

Pomacentrus ovoides CARTIER, Verh. Phys. Med. Ges. Würzburg (1873) 98.

Dorsal XIII, 12; anal II, 13; lateral line 30; transverse $\frac{4 \text{ or } 5}{9}$.

The height of the body is a little less than 2.5 in the length without caudal, the length of head slightly less than 4. The diameter of eye is greater than the length of snout.

The caudal is forked, the lobes are acute and produced into filaments. The vertical fins are brown, ventrals blackish; dorsal and anal bright at base, especially toward the posterior end, with indication of whitish dot-like spots. The preorbital is not toothed. Color of body brownish, clear

on the belly, the scales with bright edges. Forehead blue, with bright blue spots on the opercles. A round black spot above the origin of pectoral.

The body has a regular ellipsoid form, while the profile of the head forms part of the oval outline of the body.

From Bohol and Cavite.

Two specimens, 10 and 9 centimeters long.

The above account is a translation of Cartier's original description. This species appears to be very closely related to *Pomacentrus breviceps*, from which it differs in the smoothness of its suborbital.

POMACENTRUS ALBOLINEATUS sp. nov.

PLATE 14, FIG. 1

Dorsal XIV, 14; anal II, 15; scales in lateral series 26; with tubules 15 or 16; between lateral line and origin of dorsal 3; between lateral line and vent 11.

Body oblong and deep, much compressed, anterior dorsal profile steep and very slightly arched; depth of body 1.9 in length; head 3.1; depth of caudal peduncle 6.7. Interorbital space almost flat, 2.7 in length of head or almost as wide as the diameter of the large round eye which is contained 2.6 in head; the short, bluntish snout 3.4 in head, its tip on a level with inferior margin of orbit; maxillary a little longer than snout and contained 3.2 in head, its posterior end slightly behind anterior edge of eye. Mouth small and oblique, jaws even; teeth in a single row, compressed, with the cutting edges emarginate. Preorbital narrow, its greatest width scarcely half an eye diameter; suborbital with indistinct serræ below; preopercle denticulated behind, serræ well developed near the angle; opercle armed at its hind margin with a flat spine.

Scales finely ctenoid, very thin and weak, rather loosely imbricated; those covering head extending to nostrils; none present on orbital ring or on vertical limb of preopercle; a low sheath of scales covering base of vertical fins; cheek with three longitudinal rows of scales, the lowest row on inferior limb of preopercle. Lateral line ending posteriorly below origin of soft dorsal. Dorsal spines increasing in height posteriorly, the last one about as high as second anal spine. Soft vertical fins slightly rounded; caudal emarginate; both pectoral and ventral extending to vent.

Ground color in alcohol light yellowish brown; scales on body with white transverse lines near base, these lines appearing to be continuous with the transverse rows of scales; each scale at

base of anal fin with a white spot; anal opening jet black; all the other fins yellowish; pectoral with a dusky axillary spot.

Known from only two specimens, one of which is in the collection of the Bureau of Science and the other at Stanford University Museum. They measure 37 millimeters each, and were collected by Dr. Albert W. Herre at Bungau Island, Sulu Archipelago, in 1921.

This species is distinct from the other members of this genus in having a series of white transverse lines across the body.

POMACENTRUS OPISTHOSTIGMA Fowler

Pomacentrus opisthostigma FOWLER, Proc. Acad. Nat. Sci. Phila. 70 (1918).

Dorsal XIV, 14; anal II, 15; scales in lateral series 26; with tubules 15 or 16; between lateral line and origin of dorsal 3; between lateral line and vent 10.

Body ellipsoid and well compressed, with back and abdomen equally arched, greatest depth 1.9 to 2 in length; head 3 to 3.2 in length of body, with upper outline slightly more convex than lower; depth of caudal peduncle 2.1 to 2.3 in length of head or 6.6 to 6.9 in that of body. Interorbital space evenly convex and as wide as eye diameter, which is 2.9 to 3.2 in head; snout bluntly pointed and rather short, 3.2 to 3.4 in length of head and a little longer than maxillary which is contained 3.4 to 3.6; width of preorbital behind maxillary less than half eye diameter. Eye circular and a little elevated, its anterior edge above posterior end of maxillary. Mouth small and slightly oblique, jaws about even; the simple small teeth compressed and in a single series. Orbital ring distinctly serrated, first tooth enlarged and followed by a notch; only the hind limb of preopercle serrated; opercle armed with two flat spines behind.

Orbital ring, edges of preopercle and portion of snout in front of nostrils naked, and rest of head covered with scales. Dorsal spines evenly graduated to the last, which is the highest and 1.5 to 1.6 in head; second anal spine lower than last dorsal spine; soft dorsal and anal rounded; caudal fin a little emarginate; pectoral fin as long as head and reaching anus; outer ray of ventral produced into a filament which extends behind anal opening.

Color in alcohol brown, paler on belly and lower surface of head; each side of head with some scattered pearl white spots; two fine pearl white lines converging at snout, present on top of head, and a short one in front of each eye; dorsal fin deep

brown, the spinous portion black-edged; anal fin deep brown; caudal, pectoral, and ventral fins brownish, a black spot at origin of lateral line and a rather large, wedge-shaped, black mark at base of pectoral; anus black.

The above description is of two examples, 40 and 51.5 millimeters in length, collected at Bungau Island, Sulu Archipelago.

This species has been previously recorded by Fowler, from three specimens labeled "Philippine Islands."

POMACENTRUS TABLASSENSIS sp. nov.

PLATE 14, FIG. 2

Dorsal XIV, 13; anal II, 15; scales in lateral series 26; with tubules 15; between lateral line and origin of dorsal 4; between lateral line and vent 10.

Body ellipsoid, compressed, slightly elongate, with both dorsal and anal profiles about equally elevated; depth of body 2.1 in length; head 3.2; caudal peduncle rather deep and strongly compressed, its least depth 1.8 in length of head or 6.3 in that of body. Interorbital space evenly convex, 3.2 in length of head or as wide as length of eye diameter or of maxillary; snout 3.3 in head, its tip on a level with lower margin of eye. Mouth small and a little oblique; teeth in a double series in each jaw, their cutting edges rounded. Orbital ring rather coarsely serrated; first tooth enlarged and separated from the others by a notch; posterior end of maxillary below anterior edge of orbit; least width of preorbital $\frac{1}{3}$ in length of snout; vertical limb of preopercle distinctly serrated; opercle armed with a flat spine behind.

Scales on each side of body moderately large, those on top of head extending to a little in front of nostrils, leaving a narrow naked space behind upper jaw; vertical fins with a low basal sheath of scales; orbital ring and vertical edge of preopercle unscaled; cheek with four longitudinal rows of scales. Lateral line ending posteriorly below origin of rayed dorsal. Middle dorsal spines of about equal height and slightly lower than the last spine, which is 1.7 in length of head and as high as second anal; both rayed dorsal and anal rounded; caudal emarginate, with rounded lobes, the upper one slightly the longer; the broad pectoral about as long as head, its posterior end above anus; ventral extending to base of anterior anal rays, its spine as long as second anal and its outer ray produced into a filament.

Ground color of a fresh specimen brownish violet, passing into whitish below, and into yellowish posteriorly below the

rayed dorsal and on the caudal peduncle; dorsal fin brownish violet, with a blackish edge to the spinous portion; caudal slightly yellowish near base and brownish outwardly; posterior third of anal black, remaining portion whitish; pectoral slightly grayish with a small black spot superiorly at its base and axil; eye golden yellow, with a tinge of brownish violet above.

In alcohol the ground color is yellowish brown, fading into whitish below; dorsal fin yellowish brown; tail and base of caudal yellowish, rest of the fin grayish; anal black on its posterior third and whitish violet on the remaining portion; pectoral and ventral grayish, the former with a small black spot superiorly at its base and axil.

Here described from a single specimen, 95 millimeters long, collected by Mr. M. Brown, August 5, 1926, at Tablas, the largest island in Romblon Province.

Genus DAYA Bleeker

Daya BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 71; *jerdoni*.

Body oblong, elongate. Teeth in a single series, the middle ones short and large, almost flattened. Preopercle finely serrated as are the angle of opercle and the contiguous portion of subopercle; orbital ring entire. Scales of moderate size, about 30 or less in a longitudinal series; lateral line ceasing below soft dorsal fin. Dorsal fin continuous, not notched, with 13 spines.

I am obliged to separate this genus from *Pomacentrus*, from which it differs in the serration of the opercular and subopercular bones.

There is apparently but a single species, which is rare on the coast of India and in the seas of the Indo-Australasian Archipelago.

DAYA JERDONI (Day)

PLATE 15, FIG. 1

Pomacentrus jerdoni DAY, Proc. Zool. Soc. (1873) 237; Fishes of India (1878) 383, pl. 80, fig. 7; EVERMANN and SEALE, Bull. U. S. Bur. Fisheries 26 (1907) 89.

Daya jerdoni WEBER, Fische der Siboga Exped. (1913) 344.

Dorsal XIII, 12 or 13; anal II, 12 to 14; scales in lateral series 28 to 30; with tubules 19 to 21; between lateral line and origin of dorsal 6; between lateral line and vent 10.

Dorsal and ventral outlines of the oblong, elongate body similar; depth 2.5 to 2.6 in length; head 2.9 to 3.6; depth of caudal peduncle 7.1 to 8. Interorbital space with a low depression extending forward to tip of snout, its width contained

3 to 3.7 in length of head; snout 3.5 to 3.7 in head, being shorter than the diameter of the large round eye which is contained 3.1. Mouth large, almost vertical; jaws subequal; maxillary longer than width of interorbital or diameter of eye, its posterior end below front margin of orbit; teeth compressed, in a single series. Orbital ring entire, adnate to cheek; vertical limb of preopercle, angle of opercle, and the contiguous portion of subopercle serrated; opercle armed with two flat spines behind.

Scales on top of head extending to above anterior edge of pupil, leaving a naked space from there to tip of snout; pre-orbital and vertical edge of preopercle naked. Sixth and seventh dorsal spines highest. Soft vertical fins pointed posteriorly; caudal lobes produced, the upper one longer; pectoral as long as ventral and ending before vent.

Yellowish olive in alcohol, becoming lighter on the lower surface; seven series of white spots across gill opening; an unbroken line in front of eye, four more or less broken ones below it. Base of pectoral with a blotch superiorly, pectoral and ventral yellowish, the other fins dusky; dorsal and anal with light lines and spots; a row of light lines along the center of the scales on the sides.

Described from four specimens, 31 to 91 millimeters long, from Bulan, Sorsogon, and from Olongapo, Zambales. The two examples from Bulan are part of a number collected by C. J. Pierson, as recorded by Evermann and Seale, and those taken from the other locality in May, 1907, are females in near-spawning condition. A third specimen from Olongapo is now in the museum of Stanford University.

This species has been reported also from the Philippines by Max Weber, who obtained an example with a dredge in 13 meters of water at Tonquil Island, Sulu Archipelago. By the same method he collected on the Borneo Bank another specimen. No other record of the species has been reported elsewhere in the East Indies.

This species, distinct in having the angle of the opercle and the contiguous portion of the subopercle serrated, was originally described by Day from Madras, India.

Genus HEMIGLYPHIDODON Bleeker

Hemiglyphidodon BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 91; *plagiometopon*.

Ctenoglyphidodon FOWLER, Proc. Acad. Nat. Sci. Phila. 70 (1918) 59; *melanopselion*.

This genus is separated from *Abudefduf* by its very numerous and exceedingly long gill rakers, over 70 being present on the first arch, a character which I consider of generic value. It has a single series of flattened, more or less notched teeth, and entire opercular and orbital bones in common with *Abudefduf*.

Only one species is known and it is confined to the Indo-Australasian Archipelago.

HEMIGLYPHIDODON PLAGIOMETOPON (Bleeker)

PLATE 5, FIG. 1

- Glyphisodon plagiometopon* BLEEKER, Nat. Tijd. Ned. Ind. 3 (1852) 67; GÜNTHER, Cat. Fishes 4 (1862) 51; BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 103; Atlas Ichth. 9 (1878) pl. 410, fig. 4.
Abudefduf melanopselion FOWLER, Proc. Acad. Nat. Sci. Phila. 70 (1918) 59, fig. 23; FOWLER and BEAN, Proc. U. S. Nat. Mus. 62 (1922) 49.

Dorsal XIII, 12 or 13; anal II, 13 to 15; scales in lateral series 26; with tubules 15 to 18; between lateral line and origin of dorsal 4 or 5; between lateral line and vent 10.

Body oblong and deep, anterior profile oblique, slightly arched; depth of body 1.9 to 2 in length; head 2.7 to 3.1; depth of caudal peduncle 6.3 to 6.9. Interorbital space strongly convex, rather wide, being 2.7 to 3.2 in head or a little narrower than the length of the long, slightly pointed snout, which is contained 2.4 to 2.9 in head; cleft of small mouth oblique, jaws equal; maxillary 3.1 to 3.5 in head, its posterior end a little behind nostrils; eye rounded, its diameter 3.3 to 4.1 in head; teeth in a single series, with the tips truncate. Gill rakers very long and numerous, 35 + 45 on first arch. Width of preorbital at angle of mouth about $\frac{2}{3}$ eye diameter; orbitals and preopercle with entire edges; opercle armed behind with a flat spine.

Head everywhere covered with scales excepting part of snout in front of nostrils, orbital ring, and posterior edge of preopercle; dorsal and anal fins with a low basal sheath of scales. Dorsal spines increasing in height to behind. Soft dorsal and anal slightly pointed; caudal obliquely truncated; pectoral extending to anus; ventrals reaching origin of anal fin, its two outer rays about equal in length.

Color in alcohol brown, with a bluish vertical streak on each scale of body; a bluish curved line on suborbital, some bluish dots on head and on base of vertical fins. All the fins dusky, the pectoral somewhat paler than the rest and having a blackish spot at base.

The foregoing account was taken from eight examples, 87 to 122 millimeters long, coming from Bantayan Island; Samal Island and Zamboanga, Mindanao; and Bato Bato, Tawitawi, and Sitankai Islands, Sulu Archipelago. The two examples collected at Zamboanga in March, 1923, are females nearly ready to spawn.

Eight fresh examples, 29 to 55 millimeters long, obtained at a public market in Cebu, Cebu Province, are colored as follows: The ground color of large specimens yellow, with a shade of blackish violet on head and all the fins; the small examples blackish violet in front and above, bright orange yellow below and behind including the posterior dorsal rays, the caudal, and the ventrals and having a blackish violet spot at base of pectoral, and another at base of the last dorsal rays. Two pearl white lines radiating from eye toward upper jaw, the first one uniting with an opposite line at tip of snout and the other crossing pre-orbital; a third line of the same color present on orbital ring; one or more longitudinal series of pearl white spots on pre-opercle, and some scattered ones on the rest of the head and at base of vertical fins; each scale on lower half of sides with a pearl white vertical streak.

This species was first noted from the "Philippine Islands" by Fowler, and from Cebu by Fowler and Bean as *Abudefduf melanopselion*. Elsewhere it is found on the coasts of Singapore, Japan, and New Guinea.

Genus ABUDEFDUF Forskål

Abudefduf FORSKÅL, Descr. Anim. (1775) 59; *sordidus*.

Glyphisodon LACÉPÈDE, Hist. Nat. Poiss. 4 (1803) 542; *moncharra*; also spelled *Glyphidodon*.

Stegastes JENYNS, Voy. Beagle (1842) 63; *imbricatus*.

Euchistodus GILL, Proc. Acad. Nat. Sci. Phila. (1862) 145; *declivifrons*.

Amblyglyphidodon BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 92; *aureus*.

Body short and deep, compressed, with about 28 scales or less in a longitudinal series. Lateral line interrupted before posterior end of soft dorsal. Teeth in a single series, entire or notched at tips. Gill rakers not very numerous, about 28 or less being present on the first arch. A single dorsal fin with 12 or 13 spines. None of the opercles serrated, orbital ring entire.

This large genus, which is represented in the Philippines by thirteen species, is found in all tropical seas, extending northward to the latitude of Madeira in the Atlantic and of California in the Pacific, southward to the latitudes of New Zealand and South Australia.

Key to the Philippine species of Abudedefduf.

- a*¹. Body ovate-oblong, with black crossbands.
 - b*¹. Snout naked; the black crossbands wider than the interspaces.
 - c*¹. Body with six black crossbands; a large black blotch on anterior dorsal spines and another on tail..... *A. sordidus*.
 - c*². Body with seven black crossbands; no black blotch on either the spinous dorsal or the tail..... *A. septemfasciatus*.
 - b*². Snout scaled; the black crossbands not wider than the interspaces.
 - d*¹. Scales on top of head extending to nostrils.
 - e*¹. Body with seven black crossbands..... *A. bengalensis*.
 - e*². Body with five black crossbands..... *A. saxatilis*.
 - d*². Scales on top of head extending to tip of snout; body with five black crossbands; each lobe of caudal fin with a black longitudinal stripe *A. coelestinus*.
- a*². Body subcircular, with or without black crossbands.
 - f*¹. Body with three black crossbands..... *A. curaçao*.
 - f*². Body without black crossbands.
 - g*¹. Soft dorsal and anal uniformly yellow..... *A. aureus*.
 - g*². Anterior dorsal and anal rays blackish..... *A. leucogaster*.
- a*³. Body markedly oblong, without any black crossbands.
 - h*¹. Edges of teeth nearly pointed..... *A. coracinus*.
 - h*². Edges of teeth truncate or notched.
 - i*¹. Dorsal spines 13..... *A. philippinus*.
 - i*². Dorsal spines 12, rarely 13.
 - j*¹. Dorsal spines increasing in length posteriorly; a black vertical band between the soft vertical fins..... *A. dickii*.
 - j*². Middle dorsal spines longest; no black vertical band between the soft vertical fins.
 - k*¹. Spinous dorsal and back of tail with a large dark spot; body with a pearl white transverse band in the young..... *A. leucozona*.
 - k*². Spinous dorsal and back of tail without any dark spot; body without any pearl white band..... *A. lacrymatus*.

ABUDEFDUF SORDIDUS (Forskål)

PLATE 15, FIG. 2

Chaetodon sordidus FORSKÅL, Descr. Anim. (1775) 62, No. 87; BLOCH and SCHNEIDER, Syst. Ichth. (1801) 230.

Glyphisodon sordidus RÜPPELL, Fische des Rothen Meers (1828) 34, pl. 8, fig. 1; CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 349; BLEEKER, Verh. Bat. Gen. 21 (1847) 16; GÜNTHER, Cat. Fishes 4 (1862) 41; Fische der Südsee 2 (1876) 231; BLEEKER, Nat. Verh.

Holl. Maats. Wet. 2 (1877) 95; Atlas Ichth. 9 (1878) pl. 410, fig. 5;
DAY, Fishes of India (1878) 385, pl. 83, fig. 1.

Abudefduf sordidus JORDAN and SEALE, Bull. U. S. Bur. Fisheries. 25
(1906) 284; JORDAN and JORDAN, Mem. Carnegie Mus. 10 (1922) 68.

Dorsal XIII, 13 to 15; anal II, 12 to 15; scales in lateral series 26; with tubules 21 or 22; between lateral line and origin of dorsal 5; between lateral line and vent 14.

Body deep and much compressed, with the dorsal outline deeper than ventral; greatest depth of body at origin of dorsal fin, 1.8 to 1.9 in length; head 2.6 to 3; depth of caudal peduncle 5.2 to 5.3. Interorbital space 3 to 3.4 in length of head and as wide as length of either snout or maxillary; the large, round eye 2.7 to 2.8 in head. Mouth almost horizontal; teeth very narrow and slender, uniserial in each jaw. Gill rakers 7 + 17 on first arch. Orbital ring very narrow; posterior margin of opercle with two flat spines.

Scales on top of head advancing as far as front margin of orbit, leaving a naked space from there to tip of snout; no scales on orbital ring and edges of preopercle. Fourth to eighth dorsal spines highest, last dorsal spine higher than preceding one. Vertical fins obtusely rounded; caudal deeply forked; pectoral ending above anus; ventral extending to base of second anal spine, its first ray filamentous.

Color in alcohol yellowish brown, with six blackish, rather indistinct transverse bands which are much wider than the interspaces between them; the first band descending from origin of dorsal fin; the next three from the spinous dorsal; the fifth below anterior rays of dorsal fin; the last one across caudal peduncle, with its upper portion in the form of a large black spot. A black spot superiorly at base of pectoral and some minute dark spots scattered all over body. Anterior portion of spinous dorsal black; outer rays of ventral and of other fins dusky.

Of this well-marked species I have examined thirteen examples, 21 to 50 millimeters long, taken at Luna and Balaoan, La Union; Puerto Galera, Mindoro; Camiguin Island, Cagayan Province; and Bungau Island, Sulu Archipelago. The presence of a large black spot on the tail and of another on each anterior dorsal spine distinguishes the species from *Abudefduf septemfasciatus*.

This species ranges from the Red Sea and east coast of Africa eastward to Samoa and Hawaii and northward to China, Formosa, and Okinawa Islands.

ABUDEFDUF SEPTEMFASCIATUS (Cuvier and Valenciennes)

PLATE 16, FIG. 1

Glyphisodon septemfasciatus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 346; GÜNTHER, Cat. Fishes 4 (1862) 40; Fische der Südsee 2 (1876) 230; BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 97; Atlas Ichth. 9 (1878) pl. 409, fig. 5; pl. 81, fig. 7; DAY, Fishes of India (1878) 386, pl. 81, fig. 7.

Abudefduf septemfasciatus JORDAN and SEALE, Bull. U. S. Bur. Fisheries 25 (1906) 285; EVERMANN and SEALE, Bull. U. S. Bur. Fisheries 26 (1907) 93; SEALE and BEAN, Proc. U. S. Nat. Mus. 33 (1908) 385; WEBER, Fische der Siboga Exped. (1913) 247.

Dorsal XIII, 13; anal II, 12; scales in lateral series 27; with tubules 19; between lateral line and origin of dorsal 4; between lateral line and vent 11.

Body ovate-oblong, compressed, elevated, its depth 2 in length; head 2.8; depth of caudal peduncle 5.8. The convex interorbital 3.2 in length of head, as wide as length of snout; diameter of eye and maxillary equal in length, each contained 3.5 in head. Jaws even, cleft of mouth almost horizontal; teeth compressed in a single series, with the incisors emarginate. Gill rakers 8 + 15 on first arch. Width of orbital ring above angle of mouth less than half diameter of eye.

Scales absent on orbitals, chin, and edges of preopercle; snout and anterior portion of interorbital space also naked. Fourth, fifth, and sixth dorsal spines highest, equal to second anal spine. Soft dorsal produced into a point; anal rounded; caudal unequally forked, the upper lobe longer; tip of pectoral above anus; ventral fin reaching origin of anal, its first ray filamentous.

Ground color in alcohol lemon yellow, with seven blackish crossbands which are wider than the interspaces between them; the first, rather indistinct, across head; the second across neck; the third, fourth, and fifth below spinous dorsal; the sixth from anterior dorsal rays to base of anal; the last one around caudal peduncle. Spinous dorsal with a dark margin; base of caudal with a conspicuous black spot superiorly.

The above account is that of an example, 58 millimeters long, collected at Paraoir, Balaoan, La Union. I have examined also four others, 28 to 82 millimeters in length, from Guam, which are in the Bureau of Science collection.

This species has been reported previously from the "Philippine Islands" by Günther; from Bulan, Sorsogon, by Evermann and Seale; and from Zamboanga, Mindanao, by Seale and Bean. Outside of the Philippines, it occurs throughout the Red Sea

and the Indian Ocean, and from the islands of the Western Pacific to the Paumotu. It is rather widespread and common in the Indo-Australasian Archipelago.

ABUDEFDUF BENGALENSIS (Bloch)

PLATE 16, FIG. 2

Chaetodon bengalensis BLOCH, Ichth. 5 (1787) 82, pl. 213, fig. 2.

Glyphisodon bengalensis CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 342; BLEEKER, Verh. Bat. Gen. 21 (1847) 11; GÜNTHER, Cat. Fishes 4 (1862) 41; BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 99; Atlas Ichth. 9 (1878) pl. 407, fig. 4; DAY, Fishes of India (1878) 387, pl. 83, fig. 3.

Abudefduf bengalensis WEBER, Fische der Siboga Exped. (1913) 344.

Dorsal XIII, 12 to 14; anal II, 12 or 13; scales in lateral series 27; with tubules 20 to 22; between lateral line and origin of dorsal 5; between lateral line and vent 12.

Body elevated, much compressed, deepest at about anterior portion of spinous dorsal, 1.6 to 1.8 in length; head 2.8 to 3.1, its upper profile very steep and almost straight; caudal peduncle strongly compressed, very short and deep, its depth contained 4.2 to 5.8 in length of body. Interorbital space broad, moderately convex, contained from 2.8 to 3.2 in length of head; the circular, fairly large eye 3.3 to 3.8; the blunt snout 2.9 to 3.4, its tip not quite on a level with lower margin of eye; maxillary 3.2 to 3.6 or a little shorter than snout. Mouth slightly oblique, jaws equal; teeth in a single row, having emarginate edges. Gill rakers on first arch 22 or 23. Width of preorbital at posterior end of maxillary nearly equal to half diameter of orbit; opercle armed behind with two flat spines.

The naked area on head includes snout in front of nostrils, orbital ring, and edges of preopercle; a low scaly sheath at base of vertical fins. Fourth, fifth, and sixth dorsal spines highest. Soft dorsal and anal fins produced along the middle, forming acute angles; caudal fin forked, with rather broad lobes.

Body olive brown in alcohol, with seven blackish crossbands, which are a little narrower than the interspaces between them; the first, rather indistinct, across head; the second from the first two dorsal spines to axil of pectoral; the third from the fourth and fifth dorsal spines to belly; the fourth from the eighth and ninth spines to anus; the fifth from the last dorsal spines to the anterior anal rays; the sixth between the middle of soft dorsal and the posterior portion of rayed anal; the seventh in the form of a blotch on posterior half of caudal peduncle and on base of fin. A black margin on anal fin, that of the spinous

dorsal continued on the anterior rays; a dark spot superiorly at base of pectoral.

Here described from sixteen examples, 30 to 114 millimeters long, collected at Taylon and Tanao Islands, Camarines Norte; San Miguel Bay, Camarines Sur; Halsey Harbor, Culion Island; Puerto Princesa, Palawan; Placer and Cagayan de Misamis, Mindanao; and Sitankai Island, Sulu Archipelago. The specimens mentioned above are identical with two examples from Hongkong, which are now in the Bureau of Science collection.

This species differs from *Abudefduf septemfasciatus* in having narrower bands and a dark blotch at the base of the caudal fin. It has not been recorded from the Philippines heretofore, is abundant in the Gulf of Bengal and on the coast of the Andamans, and is rarely known from the Malay Archipelago.

ABUDEFDUF SAXATILIS (Linnæus)

PLATE 17, FIG. 2

Chaetodon saxatilis LINNÆUS, Syst. Nat. ed. 10 (1758) 276.

Glyphisodon saxatilis RÜPFELL, Fische des Rothen Meers (1828) 35;

GÜNTHER, Fische der Südsee 2 (1876) 229, pl. 126, fig. A (not var. *coelestina*); JORDAN and SNYDER, Proc. U. S. Nat. Mus. 24 (1902) 608; JORDAN and EVERMANN, Proc. U. S. Nat. Mus. 25 (1903) 352.

Abudefduf saxatilis JORDAN and SEALE, Bull. U. S. Bur. Fisheries 26 (1907) 28; JORDAN and RICHARDSON, Bull. U. S. Bur. Fisheries 27 (1908) 263.

Glyphisodon coelestinus GÜNTHER, Cat. Fishes 4 (1862) 38 (not the variety); BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 101; Atlas Ichth. 9 (1878) pl. 408, fig. 5; DAY, Fishes of India (1878) 386, pl. 83, fig. 2, not of Cuvier and Valenciennes.

Dorsal XIII, 12 or 13; anal II, 12 or 13; scales in lateral series 27, with tubules 20 to 23; between lateral line and origin of dorsal 5 or 6; between lateral line and vent 12.

Body deep, much compressed, dorsal outline more elevated than ventral, which is pretty evenly curved from snout to caudal peduncle; depth of body 1.7 to 2 in length; head 3 to 3.3; depth of caudal peduncle 5.4 to 6.4, or greater than its length. Interorbital space broad, strongly convex, 2.4 to 3 in length of head; eye circular, its diameter 3.1 to 3.8; the short, rounded snout nearly as long as maxillary, which is contained 3 to 3.5 in head. Mouth oblique, jaws equal, hind end of maxillary scarcely reaching the point below anterior margin of orbit; teeth in a single series, compressed, some of the incisors notched. Gill rakers on first arch 24 or 25. Preorbital narrow, its width at angle of mouth less than half diameter of eye; opercle ending in a flat spine.

Snout in front of nostrils, preorbital, and both inferior and posterior edges of preopercle naked. Middle dorsal spines of nearly uniform height, being as high as the last. Middle rays of soft dorsal and anal fins produced into a point; caudal deeply forked, with the lobes pointed and falcate; both pectoral and ventral extend to vent.

Color in alcohol brownish olive, with silvery reflection; body with five black transverse bands, which are as wide as the interspaces between them; the first descending from the front of spinous dorsal to axil of pectoral; the second extending downward from the fifth, sixth, and seventh spines to about the middle of ventral fin; the third descending from the tenth, eleventh, and twelfth spines to base of anal spines; the fourth occupying the space between most of the base of rayed dorsal and the posterior third of soft anal; the fifth covering the middle portion of tail. Head dusky, darker on snout, chin, and interorbital space; vertical fins blackish excepting the edges of the rayed portions, which are pale; caudal dusky at base and on upper and lower margins, pale at tips of rays; ventral and pectoral with a little dusky color, the latter fin with a large black spot on upper half of its base.

The above description is based upon sixty-five individuals, 17 to 125 millimeters in length, collected at the following places:

Santo Domingo de Basco, Batan Island	1
Paoay, Ilocos Norte	1
Nalvo, Luna, La Union	21
Paraair, Balaoan, La Union	3
Iba, Zambales	1
Monja Island, Corregidor (125 millimeters long, a ripe female, collected April, 1922)	1
Calapan, Mindoro	5
Legaspi, Albay	2
Despujols, Tablas	3
Sayan Island, Samar (106 and 121 millimeters long, both ripe females, collected February, 1925)	2
Tagapula Island, Samar	1
Halsey Harbor, Culion	1
Cabalian, Leyte (119 millimeters long, a ripe female, collected December, 1922)	1
Dumaguete and Siaton, Oriental Negros	12
Siquijor	1
Balabac	6
Tawitawi and Bungau Islands, Sulu Archipelago	3

There are in the Bureau of Science several examples, collected at Wakanoura, Japan, and Codd Island, Amoy, which agree in characters with the Philippine specimens.

This species has been previously recorded in the Philippines by Jordan and Seale from Manila, and by Jordan and Richardson from the same locality and Calayan Island.

Ground color of living specimens in the Bureau of Science aquarium is lemon yellow, which is much brighter above; the fourth transverse band is between the bases of the middle soft dorsal and anal fins; top of head above eyes slightly blackish; a black spot at base of pectoral; upper and lower margins of caudal fin narrowly washed with blackish; membranes of spinous dorsal edged with blackish.

This species is easily distinguished from *Abudefduf coelestinus* (Cuvier and Valenciennes) by its deeper body; by the absence of black stripes on the caudal; by the naked area on the snout, orbitals, and limbs of preopercle; and by the more anterior position of the fifth band on the tail. The examples at hand differ from American individuals in the number and relative width of the crossbands. It is probable that the original description of this species by Linnæus was based upon an East Indian specimen, but the name has been applied to both the Asiatic and the American representatives.

It is apparently widely distributed in the Philippines, and is known to inhabit the entire Indo-Pacific region from the Red Sea and the east coast of Africa to the Austral and Hawaiian Islands northward to China, Formosa, and Japan.

ABUDEFDUF COELESTINUS (Cuvier and Valenciennes)

PLATE 8, FIG. 1

Glyphisodon coelestinus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 347, pl. 135; GÜNTHER, Cat. Fishes 4 (1862) 38, var.; PETERS, Mon. König. Akad. Wiss. Berlin (1868) 271; GÜNTHER, Fische der Südsee 2 (1876) 229, pl. 126, fig. B; BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 101.

Abudefduf coelestinus JORDAN and SEALE, Bull. U. S. Bur. Fisheries 25 (1906) 285; SNYDER, Proc. U. S. Nat. Mus. 42 (1912) 505; FOWLER and BEAN, Proc. U. S. Nat. Mus. 62 (1922) 48.

Dorsal XIII, 11 or 12; anal II, 12 or 13; scales in lateral series 28; with tubules 20 or 21; between lateral line and origin of dorsal 5; between lateral line and vent 12.

Profiles evenly curved and equally elevated; body rather deep, 1.8 to 2 in length; head 2.1 to 3.4; caudal peduncle short, depth 5.6 to 6.2. Interorbital space strongly convex and rather broad, 2.7 to 3.3 in length of head, or slightly broader than length of maxillary, which is contained 2.9 to 3.4 in head; eye rounded, 3.1 to 3.9 in head; the short and rounded snout contained 3.1

to 3.6. Mouth rather small, strongly oblique, jaws equal; tip of snout on a level with lower margin of orbit; maxillary extending posteriorly at anterior edge of eye or slightly before it; teeth in a single row, compressed and rather blunt. Gill rakers 8 or 9 + 17 on first arch. Orbital ring very narrow, its width at angle of mouth less than half diameter of orbit; opercle with a flat spine at its hind margin.

Head and body completely scaly. Fifth, sixth, seventh, and thirteenth dorsal spines highest. Rayed dorsal and anal similar, produced along median into a point; caudal deeply notched, lobes falcate and rather pointed; pectoral ending above vent; ventral fin extending to origin of anal fin.

Brownish violet in alcohol; body crossed by five blackish transverse bands, which are nearly as broad as the interspaces between them; the first one from nape to base and partly to axil of pectoral; second from base of fourth to seventh dorsal spines to middle of ventral fin; third from base of last four dorsal spines to origin of anal fin; fourth between middle of soft dorsal and posterior portion of anal; fifth on hind part of caudal peduncle. Head dusky, especially on interorbital space, chin, and lips; spinous dorsal dusky; the soft vertical fins similarly colored at base, the outer portion of rays pale; caudal with a blackish streak on each lobe; pectoral and ventral more or less dusky, the former fin with a large spot at axil and another one at base.

Here described from the following examples, varying from 14 to 120 millimeters in length:

Nalvo, Luna, La Union	6
San Miguel Bay, Camarines Sur (a ripe male and 2 ripe females, 104 to 107 millimeters long, collected December, 1918)	4
Calapan, Mindoro	1
Masbate	4
Halsey Harbor, Culion	2
Bogo, Cebu	2
Cabalian, Leyte	2
Canigaran, Puerto Princesa, Palawan	4
Placer, Surigao (one, a ripe female, 105 millimeters in length, collected September, 1907)	2
Cagayan de Misamis and Zamboanga, Mindanao	6
Tawitawi, Bungau, and Sibutu, Sulu Archipelago (29 to 177 millimeters long, one a ripe female, and the others ripe males, all collected in August, 1924)	10

There is also in the Bureau of Science collection a specimen from Guam, measuring 29 millimeters long.

The first Philippine record of this species is that of Peters from the southern coast of Luzon. It has been reported also by Fowler and Bean, from Cebu, Cebu.

Living specimens in the Bureau of Science aquarium are colored as follows: Ground color bluish, fading into yellowish white below; fourth black crossband descending from middle dorsal rays through middle portion of soft anal; remaining portion of rayed dorsal yellowish; spinous dorsal edged with black; transverse band on caudal peduncle united with the black longitudinal stripe on upper lobe of caudal fin; anal spines and anterior rays blackish as is also top of head; base of pectoral black.

According to Cuvier and Valenciennes the true *Abudefduf coelestinus* has a broad blackish band near the margin of each lobe of the caudal fin. Günther and Bleeker regard this as identical with one that has the caudal plain. An examination of the specimens at hand shows that some are females and some males, proving that this particular color pattern is not a sex character. A comparison has been made with *Abudefduf saxatilis* under which I place those with the caudal unstreaked, and *Abudefduf coelestinus* seems to differ in having a less deep body, in the presence of scales on all parts of the head, and in the more posterior position of the last vertical band.

Apparently common in the neighborhood of coral reefs in the Philippines. Elsewhere it occurs from the Red Sea eastward to Polynesia.

ABUDEFDUF CURAÇAO (Bloch)

PLATE 17, FIG. 1

Chaetodon curacao BLOCH, Ichth. 5 (1787) 106, pl. 212, fig. 1.

Abudefduf curacao EVERMANN and SEALE, Bull. U. S. Bur. Fisheries 26 (1907) 93; FOWLER and BEAN, Proc. U. S. Nat. Mus. 62 (1922) 48.

Glyphisodon curassao CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 352.

Glyphisodon trifasciatus BLEEKER, Verh. Bat. Gen. 21 (1847) 19; GÜNTHER, Cat. Fishes 4 (1862) 42; Fische der Südsee 2 (1876) 231; BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 105; Atlas Ichth. 9 (1878) pl. 410, fig. 3.

Glyphisodon smaragdinus BREVOORT, Exped. Japan (1856) 264, pl. 6, fig. 3.

Dorsal XIII, 11 to 13; anal II, 12 to 14; scales in lateral series 25; with tubules 16 or 17; between lateral line and origin of dorsal 3; between lateral line and vent 10.

Body subcircular, greatly compressed, depth 1.6 to 1.7 in length; head 3 to 3.5; depth of caudal peduncle 5.8 to 6.3. Interorbital wide, convex, and slightly bulging, 2.5 to 2.8 in length of head; eye large and circular, 2.5 to 3.1; snout short, pointed, 3 to 3.8, shorter than maxillary, which is contained 2.7 to 3.1 in head and ends posteriorly behind front margin of orbit. Mouth oblique, jaws equal; teeth uniserial, those in front with sharp cutting edges, and those on sides more or less notched. Gill rakers about 27 on first arch. Preorbital with a shallow notch in front, its greatest width less than half diameter of eye; suborbital very narrow.

Head and body completely covered with scales. Middle dorsal spines highest, but lower than second anal spine. Soft dorsal angular, its height almost equal to length of head; anal rounded; caudal forked, with the lobes pointed; ventral fin much longer than pectoral, its outer ray produced into a long filament which reaches base of anterior anal rays.

Brownish olive in alcohol, with three black, rather ill-defined crossbands, wider above and formed by black spots on the cutaneous sheaths of the transparent scales; the first one below the anterior dorsal spines, the second one from the posterior dorsal spines to vent, and the third between the soft dorsal and anal. Spinous dorsal, anterior two-thirds of anal, and upper and lower margins of caudal blackish, the remainder of these fins yellowish; pectoral pale, ventrals a little dusky.

Here described from thirty-five specimens, 37 to 85 millimeters in length, obtained at the following places: Sialat Point, Catanduanes Island; Puerto Galera and Calapan, Mindoro; Bacon, Sorsogon; Bantayan Island and Bogu, Cebu; Cabalian, Leyte; and Tawitawi, Bungau, and Sibutu Islands, Sulu Archipelago. A single specimen, 71 millimeters long, collected at Sialat Point in September, 1925, and two others, each 75 millimeters in length, taken at Cabalian in December, 1922, are females about ready to spawn. The example from Bacon has been recorded before by Evermann and Seale. Fowler and Bean also listed this species, from Zamboanga.

A living specimen at the Bureau of Science aquarium is yellowish with bluish black spots on some of the scales of head and trunk, forming ill-defined transverse bands which become lighter and narrower on the lower parts. The number and nature of these bands, together with the subcircular shape of the body, the slender dorsal spines, and the long strong second anal spine, make this species distinct from the others.

It is known from the East Indies, and ranges eastward through New Guinea to Shortland Island and northward to the Riu Kiu Archipelago.

ABUDEFDUF AUREUS (Cuvier and Valenciennes)

Glyphisodon aureus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 353; SCHLEGEL and MÜLLER, Overz. Amphi. Verh. Nat. Ges. Ned. Overz. Bezitt. (1839) 22, pl. 5, fig. 1; CUVIER, Regne Anim. Ill. Poiss. (1840) pl. 33, fig. 1; BLEEKER, Labr. Cten. (1847) 21; GÜNTHER, Cat. Fishes 4 (1862) 45; BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 109; Atlas Ichth. 9 (1878) pl. 405, fig. 4. *Abudefduf aureus* WEBER, Fische der Siboga Exped. (1913) 348.

Dorsal XIII, 12; anal II, 14; scales in lateral series 24 to 26; with tubules 15 to 18; between lateral line and origin of dorsal 4; between lateral line and vent 10 or 11.

Body subcircular, strongly compressed, its depth contained 1.5 to 1.6 in length; head 2.9 to 3.2; depth of caudal peduncle 5.7 to 6.1. Interorbital strongly convex, rather broad, 2.6 to 2.9 in length of head; eye large and circular, 2.5 to 3.2; snout short and blunt, 3 to 3.3; maxillary 3 to 3.4. Teeth in a single series, those in front small and scarcely emarginate. Gill rakers on first arch 27. Preorbital with a distinct notch above maxillary, its width at angle of mouth less than half an eye diameter.

Scales extending forward to tip of snout, also covering orbital ring and preopercular limbs. Middle dorsal spines lower than the thirteenth. Soft portion of dorsal and anal fins produced into a point; caudal forked, having pointed lobes; pectoral fin reaching base of anal spines and ventral extending to base of anterior anal rays.

Uniformly yellowish brown in alcohol, without any blackish marking anywhere except on outer edge of membranes of spinous dorsal.

Here described from eleven specimens, 62 to 108 millimeters long, collected at Calapan, Mindoro; Gaspar Island, Marinduque; Tablas Island; Tagapula Island, Samar; New Washington, Capiz; and Cabalian, Leyte. An example, 104 millimeters long, obtained at Gaspar Island in March, 1925, and a slightly smaller one, taken at Cabalian in May, 1921, are females about ready to spawn.

This species is new to the Philippines and is known elsewhere in the Indo-Australasian Archipelago from Java, Celebes, Amboina, and Banda.

ABUDEFDUF LEUCOGASTER (Bleeker)

Glyphisodon leucogaster BLEEKER, Verh. Bat. Gen. 21 (1847) 20; GÜNTHER, Cat. Fishes 4 (1862) 46; BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 108; Atlas Ichth. 9 (1878) pl. 407, fig. 6; DAY, Fishes of India (1878) 388, pl. 81. fig. 3.

Abudefduf leucogaster FOWLER and BEAN, Proc. U. S. Nat. Mus. 62 (1922) 48.

Dorsal XIII, 11 or 12; anal II, 12 to 14; scales in lateral series 24 to 26; with tubules 15 or 16; between lateral line and origin of dorsal 4; between lateral line and vent 9 or 10.

Body strongly compressed, subcircular in outline, its depth 1.6 to 1.8 in length; head 2.8 to 3.2; depth of caudal peduncle 6 to 6.6. Interorbital space broad, its width 2.5 to 2.9 in length of head; eye rounded and rather large, 2.6 to 3.3; snout shorter than eye, 3.1 to 3.4 in head or nearly as long as maxillary which is contained 2.9 to 3.3 in head. Teeth compressed, in a single series, the incisors short and very small. Gill rakers on first arch 27 or 28. Preorbital very narrow, having a shallow notch in front.

Head and body completely covered with scales. Middle dorsal spines as high as the last. Soft dorsal angular; the rayed anal rounded; caudal forked, with the lobes pointed; pectoral extending to origin of anal fin; ventral longer than pectoral, its first ray filamentous.

Yellowish brown in alcohol, with scattered blue dots in the young. Base and axil of pectoral with a prominent black spot superiorly; posterior two-thirds of soft dorsal and hind third of rayed anal yellowish, the other portions of the fins blackish; upper and lower margins of caudal washed with blackish.

I have examined twenty-two specimens, 40 to 90 millimeters long, coming from Calapan, Mindoro; Cabalian, Leyte; and Jolo, Bungau, and Sibutu Islands, Sulu Archipelago. Two of the specimens from Cabalian, collected in May, 1920, are females about ready to spawn.

In the Bureau of Science aquarium there are three living specimens, which are dark brown merging into golden yellow on belly and with a silvery center to each scale; caudal peduncle yellowish as is the fin with the exception of the middle rays which are whitish; posterior portion of rayed dorsal and anal yellowish; ventrals yellowish, pectoral whitish.

This species was first recorded in the Philippines from Zamboanga, Mindanao, by Fowler and Bean, and is known to occur from the Red Sea, east coast of Africa, and the Nicobars to the Indo-Australasian Archipelago.

ABUDEFDUF CORACINUS Seale

PLATE 18, FIG. 1

Abudefduf coracinus SEALE, Philip. Journ. Sci. § A 4 (1909) 521, pl. 13.

Dorsal XIII, 13; anal II, 13; scales in lateral series 26; with tubules 18; between lateral line and origin of dorsal 4; between lateral line and vent 11.

Body markedly deep and compressed, its depth contained 1.9 to 2 in length; ventral outline of body deeper than dorsal; anterior dorsal profile from tip of snout to origin of dorsal very oblique and slightly convex; head 3.2 to 3.4 in length of body; depth of caudal peduncle 5.5 to 5.7. Interorbital space strongly arched, wider than length of snout, 2.6 to 2.7 in head; eye round, small, its diameter 3 to 3.8; maxillary 2.9 to 3.3 in length of head and about as long as the rounded snout, which is horizontally in front of inferior border of orbit. Mouth small, oblique, jaws equal; maxillary not reaching anterior margin of eye; teeth in a single series, with rounded tips. Gill rakers on first arch 22. Preorbital above angle of mouth nearly half as wide as interorbital.

Body covered with large, weakly ctenoid scales. Snout naked below and in front of nostrils; orbital ring also naked. Dorsal spines increasing in height posteriorly, the last one 1.7 to 1.8 in length of head. Soft dorsal and anal rounded, their middle rays highest; caudal scarcely emarginate, with the lobes rounded; pectoral rounded, 1.8 to 2 in depth of body, its tip within two scales from vent; ventral extending to vent, with the outer ray produced.

According to Seale the color of this fish in life is uniform dark brown or blackish. Its color in alcohol is blackish brown; a blackish spot at axil of pectoral.

Here described from the type and three other specimens, measuring 58 to 99 millimeters long. The type was collected at Sitankai Island, and the others were collected at Sibutu Island, both in the Sulu Archipelago.

In the general form of the body and the relative size of the scales, this species is nearest to *Abudefduf rhomaleus* Snyder, but differs from it in having the orbital ring naked.

ABUDEFDUF PHILIPPINUS Fowler

Abudefduf philippinus FOWLER, Proc. Acad. Nat. Sci. Phila. 70 (1918) 54, fig. 21.

Head $2\frac{1}{2}$; depth $1\frac{1}{2}$; D. XIII, 11; A. II, 12; P. I, 14; V. I, 5; tubes in upper part of lateral line 17, and pores in straight section 7; 3 scales above lateral line to spinous dorsal origin and about 8 scales below in vertical row to spinous anal origin; about 14 predorsal scales; head width $1\frac{1}{2}$ its length; head depth 1; snout $3\frac{1}{4}$; eye $2\frac{1}{2}$; maxillary $3\frac{1}{2}$; interorbital $2\frac{1}{2}$; third dorsal spine 2; thirteenth dorsal spine $2\frac{1}{2}$; fifth dorsal ray $1\frac{2}{3}$?; second anal spine $1\frac{1}{2}$; fifth anal ray $1\frac{2}{3}$; least depth of caudal peduncle $2\frac{1}{2}$; caudal $1\frac{1}{2}$; pectoral $1\frac{1}{2}$; ventral $1\frac{1}{10}$.

Body well compressed, contour orbicular, deepest midway in length, predorsal with slight median keel and other edges convexly rounded. Caudal peduncle compressed, length $1\frac{1}{2}$ in its least depth.

Head moderate, well compressed, evenly constricted above and below, profiles similarly inclined. Snout convex over surface, very slightly so in profile, length $\frac{2}{3}$ its width. Eye large, close to upper profile, and hind pupil edge nearly midway in head length. Mouth well inclined, gape moderate, and jaws about even. Maxillary extends back slightly beyond front eye edge, though not quite to that of pupil, upper edge entirely slips below preorbital. Row of moderate, even, rather crowded, compressed incisors in each jaw, end of each tooth truncate, and whole forms even cutting-edge. No teeth on tongue or mouth roof. Tongue depressed, pointed, free. Inner buccal folds broad. Lips fleshy, moderately wide. Nostril slightly behind middle in snout length. Interorbital convex. Preorbital width $3\frac{1}{4}$ in eye. Hind preopercle edge slopes well forward, so that angle would fall nearly opposite center of eye, and like lower preorbital and suborbital edges, entire.

Gill-opening forward opposite front pupil edge. Rakers $7 + 16$, lanceolate, longest about long as gill-filaments or 3 in eye. Pseudobranchiæ slightly longer than gill-filaments. Isthmus narrowly constricted, trenchant, branchiostegal membrane moderately broad across.

Scales finely ctenoid, narrowly imbricated, in even lengthwise rows, smaller along body edges. Fins all scaly basally. Suprascapula thin, entire, small. Cheek with 4 rows of scales. Opercle with moderate scales, small on interorbital, and still smaller on upper part of snout. Moderate scales on suborbitals and preorbital. Chin, lips, and narrow strip on front of snout naked, though mandible scaly. Scaly ventral flaps damaged. Lateral line with upper branch curving up at first, and then largely concurrent with upper limit of general squamation on dorsal fins, and ends below soft dorsal origin. Tubes simple, large, extend nearly over first half in scale exposure. Pores in horizontal section inconspicuous, small, and one in middle of each scale exposure, not on caudal base.

Spinous dorsal inserted opposite pectoral origin, spines rapidly graduated up to third, then subequal, fin edge well notched. Soft dorsal origin nearly at last third between upper hind preopercle edge and caudal base, rays graduated up to sixth and seventh, which form sharp point behind. Spinous anal inserted well before soft dorsal, first spine about 3 in second, or fin origin nearly midway between ventral origin and caudal base. Soft anal like soft dorsal. Caudal (damaged) apparently little emarginate behind. Pectoral reaches anal. Ventral inserted below middle of pectoral base, nearly reaches soft anal origin, and spine nearly $\frac{3}{4}$ fin length. Vent close before anal.

Color in alcohol largely faded dull brownish generally, predorsal, head above and front of back with traces of darker mottlings. Fins all pale uniform brownish. Iris slaty.

Length 41 mm. (caudal tip damaged).

Type, No. 47,531, A. N. S. P.

Philippine Islands. Presented by the Commercial Museums of Philadelphia.

No. 47,532, paratype, same data. It shows: Head $2\frac{1}{2}$; depth $1\frac{1}{2}$; D XIII, 11; A. II, 12; tubes in upper arch of l.l. 17 and pores in straight portion 7; snout $3\frac{3}{4}$ in head; eye 2; maxillary 3; interorbital $2\frac{3}{4}$, length 36 mm.

Apparently falls within the subgenus *Amblyglyphidodon* Bleeker, and without much in common with the four East Indian species Bleeker describes.

The above is Fowler's original description.

ABUDEFDUF DICKII (Lienard)

Glyphisodon dickii LIENARD, Dix. Rapp. Soc. Hist. Nat. Maurice (1839) 35; BLEEKER, Ned. Tijds. Dierk. 1 (1863) 274; GÜNTHER, Fische der Südsee 2 (1876) 232, pl. 125, fig. C; BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 115; Atlas Ichth. 9 (1878) pl. 409, fig. 7.

Abudefduf dicki JORDAN and SEALE, Bull. U. S. Bur. Fisheries 25 (1906) 285, pl. 41, fig. 2; JORDAN and RICHARDSON, Bull. U. S. Bur. Fisheries 27 (1908) 263.

Glyphisodon unifasciatus KNER and STEINDACHNER, Sitz. Akad. Wiss. Wien (1867) 375.

Dorsal XII, 17; anal II, 14; scales in lateral series 28; with tubules 21; between lateral line and origin of dorsal 3; between lateral line and vent 11.

Dorsal profile deeper than ventral, upper outline of head very steep; greatest depth of body 2 in length; length of head 3.2; depth of caudal peduncle 5.8. Interorbital space rather wide, 2.8 in head; eye rounded, its diameter as long as maxillary, which is 3.7 in head; snout almost as long as width of interorbital, 2.8 in head, with its tip lower than inferior margin of orbit; teeth uniserial, with notched edges. Gill rakers about 23 on first arch. Greatest width of preorbital greater than half diameter of eye.

Head covered entirely with scales; base of vertical fins with a rather high sheath of scales. Dorsal spines increasing in height posteriorly; second anal spine equal in height to last dorsal. Soft dorsal and rayed anal produced along the middle, forming acute angles; caudal deeply forked, with the lobes rounded; pectoral ending before vent; first ray of ventral prolonged into a filament, which terminates at base of anal spines.

Color in alcohol dark orange brown, with a blackish streak at edge of each scale; a black transverse band between anterior portion of soft dorsal and base of anal rays; behind this band the color is dull yellowish orange covering caudal peduncle and fin, and posterior dorsal and anal rays. Ventral blackish, pectoral yellowish orange.

Here described from a single specimen, 74 millimeters in length, which I examined in the museum of Stanford University. It was collected by R. C. McGregor at Cagayancillo, Cagayan Islands, as recorded by Jordan and Richardson.

This species, originally known from the Mauritius, occurs also in the East Indies where few representatives were taken. It is well known at Guam, Ponape, and Samoa.

ABUDEFDUF LEUCOZONA (Bleeker)

PLATE 18, FIG. 2

Glyphisodon leucozona BLEEKER, Nat. Tijds. Ned. Ind. 19 (1859) 338; GÜNTHER, Cat. Fishes 4 (1862) 49; Nat. Verh. Holl. Maats. Wet. 2 (1877) 112; Atlas Ichth. 9 (1878) pl. 407, fig. 2.

Abudefduf leucozona WEBER, Fische der Siboga Exped. (1913) 349.

Dorsal XII, 15; anal II, 12; scales in lateral series 25; with tubules 20; between lateral line and origin of dorsal 4; between lateral line and vent 10.

Body deep, 1.9 in length; dorsal outline more elevated than ventral; head 2.8; depth of caudal peduncle 6. Eye large and round, diameter 3.3 in length of head, or as long as the pointed snout; mouth small and almost horizontal; jaws equal; the maxillary, which ends posteriorly under anterior edge of orbit, 3.7 in head or equal to width of interorbital space; teeth in a single row, compressed, and notched. Gill rakers 19 on first arch. The orbital ring behind angle of mouth less than half diameter of eye.

Preorbital in front of eye and margins of preopercle naked, rest of head scaly; vertical fins with a high scaly sheath at base. The fifth, sixth, and seventh spines highest, being higher than second anal. Soft dorsal and anal about equal in height; caudal emarginate with the lobes rounded; pectoral ending above vent, its upper rays longest; first ray of ventral fin produced into a filament, which extends to base of anal spines.

Yellowish brown in alcohol, with a white vertical band descending from sixth, seventh, and eighth dorsal spines; a large dark ocellus edged with white at base of last three dorsal spines and above lateral line; another dark spot on back of tail imme-

diately after dorsal fin; a small one superiorly at base of pectoral. Ventrals and tips of soft anal dusky, the fins yellowish.

The specimen above described is 32 millimeters in length and was obtained at Balabac Island, Palawan. In coloration this species resembles *Chrysiptera brownriggii* (Bennett), but is easily distinguished by its deeper body.

This is the first Philippine record of this species; it is rare in the rest of the Indo-Australasian Archipelago, from whence only it is known.

ABUDEFDUF LACRYMATUS (Quoy and Gaimard)

PLATE 7, FIG. 1

Glyphisodon lacrymatus QUOY and GAIMARD, Voy. Uranie, Zool. 2 (1824) 388, pl. 62, fig. 7; CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 478; GÜNTHER, Cat. Fishes 4 (1862) 49; Fische der Südsee 2 (1876) 232, pl. 125, fig. D; BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 111; Atlas Ichth. 9 (1878) pl. 404, fig. 6. *Abudefduf lacrymatus* SEALE, Polyn. Ethnol. Nat. Hist. 1 (1901) 83; JORDAN and SEALE, Bull. U. S. Bur. Fisheries 25 (1906) 285.

Dorsal XII or XIII, 15 to 17; anal II, 12 or 13; scales in lateral series 25; with tubules 18 or 19; between lateral line and origin of dorsal 3; between lateral line and vent 10.

Dorsal outline deeper and more arched than ventral; body short and deep, contained 1.8 to 1.9 in length; head 2.9 to 3.1; depth of caudal peduncle 6.1 to 6.6. Interorbital space 3 in head; eye circular, 3 to 3.3; mouth rather small, horizontal, lower jaw slightly included; snout 3.2 to 3.4 in head and about as long as maxillary, with the tip slightly pointed and not quite on a level with lower margin of orbit; teeth in a single series, compressed, with notched edges. Gill rakers on first arch 23. Width of preorbital above posterior end of maxillary greater than half diameter of eye; opercle provided with a flat spine behind.

Head and body completely scaled; base of vertical fins with a rather high sheath of scales. Posterior dorsal spines highest. Rayed dorsal and anal equal in height; caudal forked, with the lobes a little pointed, the upper one slightly the longer. Pectoral not reaching anal opening; ventral about as long as head, its first ray filamentous.

Fresh specimens deep brown with sapphire spots scattered over body and vertical fins; tail yellow; dorsal with a broad blackish margin; pectoral with a black spot at base.

Brownish in spirits, with small, scattered, bluish white spots; posterior dorsal rays, caudal peduncle, and fin yellowish; spinous

dorsal dusky on outer portion; pectoral whitish, with a blackish spot across its base; anal and ventrals dusky.

The above account is from seven examples, 43 to 65 millimeters long, taken at Tagbilaran, Bohol; Canigaran, Palawan; and Tambagaan, South Ubian, Bungau, and Sitankai Islands, Sulu Archipelago. Two specimens from Guam, which I have examined, in the Bureau of Science collection, agree in every respect with the Philippine representatives.

This species has not been noted previously from the Philippines. It occurs in almost all parts of the Indo-Australasian Archipelago, whence it ranges eastward to Samoa.

Genus CHRYSIPTERA Swainson

Chrysiptera SWAINSON, Nat. Hist. Fish. 2 (1839); *azureus*; not

Chrysoptera Latreille (1885), a genus of Lepidoptera.

Paraglyphidodon BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 116; *bonang*.

Glyphidodontops BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 128; *cyaneus*=*azureus*.

Body oblong or ovate, deep or elongate. Scales large or moderate in size, about 26 or less in longitudinal series; lateral line interrupted before the end of soft dorsal fin. Teeth in a double series, compressed, with entire edges. A single dorsal fin with 13 spines. Orbital ring and all the opercular bones entire.

Under *Chrysiptera* Bleeker recognizes two genera: *Paraglyphidodon*, with the body rather deep, teeth more or less rounded, and the snout scaly; and *Glyphidodontops*, with the body oblong or slightly elongate, the teeth more or less truncate, and the snout naked. It differs from *Abudefduf* in the presence of two rows of teeth.

Thirteen species of this genus are known to occur in the Philippines; it is widely distributed from the Red Sea and the east coast of Africa to Polynesia.

Key to the Philippine species of *Chrysiptera*.

*a*¹. Body markedly oblong and deep; snout scaly.

*b*¹. Orbital ring and vertical limb of preopercle scaly.

*c*¹. Body and fins uniformly blackish brown..... *C. melas*.

*c*². Ventrals and anterior portion of anal black.

*d*¹. Spinous dorsal and some of the anterior dorsal rays edged with the blackish color; side of head with two dark vertical bands.

C. xanthura.

*d*². Dorsal fin and head without mark of any kind.... *C. xanthonota*.

*b*². Orbital ring and vertical limb of preopercle naked..... *C. oxyodon*.

- a*². Body ovate-oblong, more or less elongate; snout naked.
- c*¹. Suborbital naked.
- f*¹. Scales on top of head extending to above front rim of eye.
- g*¹. Middle dorsal spines shorter than or about as long as posterior ones *C. uniocellata*.
- g*². Middle dorsal spines longer than posterior ones.
- h*¹. Head with some dark streaks in front.
- i*¹. Each scale of body with a dark vertical streak.... *C. parasema*.
- r*¹. Scales of body dotted.
- j*¹. Each scale indistinctly dotted with white..... *C. cyanea*.
- j*². Each scale with one or two black dots..... *C. assimilis*.
- h*². Head without any dark lines in front..... *C. turchesius*.
- f*². Scales on top of head extending to above nostrils.
- k*¹. Body with three yellow crossbands; dorsal fin without any ocelli.
C. amabilis.
- k*². Body with a single yellow crossband, present only in some individuals; dorsal fin with two dark ocelli in the young.
C. brownriggii.
- e*². Suborbital scaly.
- l*¹. A small black spot at origin of lateral line..... *C. rex*.
- f*². Body unmarked..... *C. glauca*.

CHRYSIPTERA MELAS (Cuvier and Valenciennes)

PLATE 19, FIG. 2

Glyphisodon melas CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 353; SCHLEGEL and MÜLLER, Overz. Amphi. Verh. Nat. Ges. Ned. Overz. Bezitt. (1839) 23, pl. 5, fig. 2; GÜNTHER, Cat. Fishes 4 (1862) 45.

Paraglyphisodon melas BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 123; Atlas Ichth. 9 (1878) pl. 404, fig. 4.

Chrysiptera melas JORDAN and SNYDER, Proc. U. S. Nat. Mus. 24 (1902) 605.

Glyphisodon ater CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 473.

Glyphisodon violascens BREVOORT, Exped. Japan (1856) 264.

Dorsal XIII, 13 or 14; anal II, 12 or 13; scales in lateral series 26; with tubules 16 or 17; between lateral line and origin of dorsal 4; between lateral line and vent 11.

Body oblong, rather deep, contained 1.8 to 2 in length; the short head 3.1 to 3.5; caudal peduncle short, depth 5.8 to 6.4. Interorbital strongly arched, 2.4 to 2.8 in length of head, slightly bulging on top of head; eye small, circular, 3.2 to 4.3; snout blunt, 2.8 to 3.1 in head or slightly longer than maxillary, which is contained 3 to 3.4 in head. Teeth in two series, very narrow, scarcely compressed. Width of preorbital at posterior end of maxillary a trifle greater than half diameter of orbit.

Head and body completely covered with large ctenoid scales. Dorsal spines low, very strong, becoming higher posteriorly.

Soft dorsal and anal rounded, and of about the same height; pectoral not reaching vent; caudal slightly emarginate.

Uniformly blackish brown in alcohol, with very light greenish reflections.

Here described from thirteen specimens, 68 to 147 millimeters in length. They were collected at Sialat Point, Catanduanes Island; Puerto Galera and Calapan, Mindoro; Surigao, Samal Island, and Zamboanga, Mindanao; and Tambagaan, Bungau, and Sibutu Islands, Sulu Archipelago. In the Bureau of Science aquarium are eight living examples, which are deep rich violet throughout with no mark of any kind on the body.

This species, which is now recorded for the first time from the Philippines, ranges from the Red Sea through the East Indies to the New Hebrides.

CHRYSIPTERA XANTHURA (Bleeker)

Glyphisodon xanthurus BLEEKER, Nat. Tijds. Ned. Ind. 5 (1853) 345;

GÜNTHER, Cat. Fishes 4 (1862) 47.

Paraglyphidodon xanthurus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 122; Atlas Ichth. 9 (1878) pl. 405, fig. 3.

Abudefduf xanthurus EVERMANN and SEALE, Bull. U. S. Bur. Fisheries 26 (1907) 92.

Dorsal XIII, 14; anal II, 13; scales in lateral series 25; with tubules 17; between lateral line and origin of dorsal 4; between lateral line and vent 10.

Upper and lower outlines of head nearly straight and almost at right angles with each other; body deep and oblong, 1.9 in length; head 3.5; depth of caudal peduncle 6.3. Interorbital space broad, strongly convex, and 2.6 in length of head; snout rounded, as long as eye diameter, which is 3.5 in head. Jaws even, cleft of mouth slightly oblique; maxillary, which is a trifle shorter than snout, extends posteriorly a little before anterior margin of orbit; two rows of bluntish teeth present.

Head with scales everywhere except on symphysis of lower jaw. Posterior dorsal spines highest. Middle rays of soft dorsal and anal forming acute angles; caudal emarginate; pectoral as long as ventral, longest above and extending to above anus.

Brownish orange in alcohol, with a blackish violet edge on spinous dorsal and on anterior portion of soft vertical fins. Pectoral with a brown axillary spot superiorly. A bluish line extending from tip of snout to front of orbit; two dark vertical bands on each side of head, one below orbit and the other immediately behind preopercle.

In the Bureau of Science collection is a single specimen, 72 millimeters long, which is described above. It is one of the eleven examples obtained at Bacon, Sorsogon, as reported by Evermann and Seale.

Outside of the Philippines, it is known from the coasts of Flores, Sangir, Amboina, and Ceram.

CHRYSIPTERA XANTHONOTA (Bleeker)

Glyphisodon xanthonotus BLEEKER, Nat. Tijds. Ned. Ind. 18 (1859) 357; GÜNTHER, Cat. Fishes 4 (1862) 48.

Paraglyphidodon xanthonotus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 126; Atlas Ichth. 9 (1878) pl. 404, fig. 3.

Dorsal XIII, 13; anal II, 13; scales in lateral series 24; with tubules 15; between lateral line and origin of dorsal 4; between lateral line and vent 11.

Body oblong, slightly elevated; profiles similar, equal in depth; depth of body 1.7 to 1.8 in length; head 2.9 to 3.2; depth of caudal peduncle 5.5 to 6. The slightly convex interorbital 3 to 3.2 in length of head; the large eye 2.6 to 2.7, high up on head; snout 3.5 to 3.8; maxillary 3.3 to 3.5, its posterior end below anterior margin of orbit. Mouth slightly oblique, jaws even; teeth very narrow and pointed, in two series. Suborbital ring less than half an eye diameter at its greatest width; opercle ending behind in a large flat spine.

Head and body covered everywhere with scales; base of dorsal and anal fins with a moderately high sheath of scales. Dorsal spines becoming higher toward the last. Soft vertical fins produced along the middle into a point; caudal emarginate, pectoral pointed superiorly, its tip above origin of anal; ventral extending to base of second anal spine, its outer ray filamentous.

In life the lower three-fourths of body, the posterior dorsal rays, and caudal are dark violet; upper part of head, back, and dorsal fin clear yellow; caudal fin has a yellow stripe on its upper and lower margins; the ventrals have a blackish violet spot between first and second rays; the anal has a large blackish violet blotch on outer portion of its anterior rays, the remaining portion varying from pale violet to clear yellow posteriorly.

Violet yellow in alcohol; anal blackish anteriorly, ventral similarly colored, with the tip whitish; upper and lower margins of caudal paler.

This species is easily identified by its deep body, and by the persistent deep blackish violet color on the ventral and anal fins. Known for the first time in the Philippines, from two

specimens, 30 and 48 millimeters long, obtained in Surigao and Zamboanga, Mindanao. Elsewhere reported only from Bawean Island, off the north coast of Java.

CHRYSIPTERA OXYODON (Bleeker)

Glyphisodon oxyodon BLEEKER, Act. Soc. Sci. Ind. Neerl. 3 (1858) 14; GÜNTHER, Cat. Fishes 4 (1862) 44.

Paraglyphidodon oxyodon BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 127; Atlas Ichth. 9 (1878) pl. 404, fig. 2.

Dorsal XIII, 13; anal II, 13; scales in lateral series 25 or 26; with tubules 16 or 17; between lateral line and origin of dorsal 4; between lateral line and vent 10.

Body oblong and deep, 1.9 to 2 in length, with dorsal and ventral outlines equally elevated; head 2.8 to 3.1 in length of body; depth of caudal peduncle 5.7 to 5.9. Interorbital space a little arched, contained 3 to 3.4 in length of head, or as wide as the diameter of the large, round eye or the length of maxillary; snout 3.4 in head, its tip slightly pointed and on a level with inferior margin of orbit. Teeth in two series, those on upper jaw slender, compressed, and pointed, some of those on lower lobate. Greatest width of preorbital half diameter of eye; opercle ending in a flat spine.

Scales entirely covering head, except from nostrils to tip of snout, orbitals, and limbs of preopercle; a moderately high basal sheath of scales on vertical fins. Dorsal spines evenly graduated toward the last, which is the highest. Soft dorsal and anal rounded and produced along the middle; caudal slightly emarginate, with the lobes rounded; pectoral terminating before vent; outer ray of ventral produced into a filament, which reaches origin of anal fin.

Color in alcohol brownish violet, with four bluish white oblique bands: The first from below origin of spinous dorsal to and around tip of snout; second from origin of soft dorsal to below lateral line; third from top of tail ending below base of dorsal rays; fourth running backward across opercles from chin. A fifth vertical band, pearl white in color, around body through belly and dorsal spines, appearing as a dull whitish blotch scarcely noticeable in some specimens; a brownish spot superiorly at base of pectoral.

The four specimens above described were taken at Sitankai Island, Sulu Archipelago. They range from 31 to 75 millimeters in length. This species is very striking on account of the arrangement of its bands and because of the nature of its

teeth. It is one of the most beautiful pomacentrids seen among the coral reefs, which are its favorite haunts. With the exception of the milk-white vertical streak, the specimens referred to resemble Bleeker's figure.

There is no previous record of this species from the Philippines. Hitherto known only from the Celebes Sea.

CHRYSIPTERA UNIOCELLATA (Quoy and Gaimard)

Glyphisodon uniocellatus QUOY and GAIMARD, Voy. Uranie, Zool. 2 (1824) 393, pl. 64, fig. 4; CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 360; SCHLEGEL and MÜLLER, Overz. Amphi. Verh. Nat. Ges. Ned. Overz. Bezitt. (1839) 23; GÜNTHER, Cat. Fishes 4 (1862) 52; Fische der Südsee 2 (1876) 234, pl. 128, fig. A (not of Bleeker).

Abudefduf uniocellatus JORDAN and SEALE, Bull. U. S. Bur. Fisheries 25 (1906) 288, pl. 43, fig. 2.

Dorsal XIII, 11 to 13; anal II, 11 to 13; scales in lateral series 25; with tubules 16; between lateral line and origin of dorsal 3; between lateral line and origin of anal 10.

Body ovate, slightly elongate, with dorsal and ventral profiles similarly and evenly curved; depth 2.8 to 2.9 in length; head 3.1 to 3.2; depth of caudal peduncle 6 to 6.5. Interorbital space slightly convex, 3.4 to 4.2 in head; eye large and round, diameter 2.8 to 2.9, longer than snout which is 3.4 to 5 in head, or maxillary which is contained 2.8 to 4.5 in head. Mouth very small, almost horizontal, with the jaws equal; tip of snout nearly on a level with lower edge of pupil; maxillary extending posteriorly past below front margin of orbit; teeth very narrow, in a double series. Greatest width of preorbital about a third of eye diameter; opercle with two flat spines behind.

No scales on snout, orbitals, or limbs of preopercle. Middle and posterior dorsal spines nearly the same height. Soft vertical fins angular, produced along the median; caudal subtruncated, with rounded lobes; pectoral terminating above vent; outer ray of ventral produced into a filament, which extends to origin of anal fin.

Color of alcoholic specimens bluish, with one or two yellow spots on each scale; a dark band along middle of nape and of forehead; a wide one convergent at snout, passing through eye, to origin of lateral line; a third one across preorbital and upper jaw. A small round black spot occupies base of last three dorsal rays and the axil of the fin. Pectoral light violet, the outer portion of the other fins yellowish.

Here described from six specimens, 19 to 35.5 millimeters long. collected at Despujols, Tablas Island; Tacloban, Leyte; Port Canaan, Siquijor Island; and Zamboanguita, Oriental Negros.

This species, not heretofore recorded from the Philippines, is known to occur in the Indo-Australasian Archipelago and in Polynesia, excluding Hawaii.

CHRYSIPTERA PARASEMA (Fowler)

PLATE 19, FIG. 1

Abudefduf parasema FOWLER, Proc. Acad. Nat. Sci. Phila. 70 (1918) 56, fig. 22.

Dorsal XIII, 11; anal II, 12; scales in lateral series 26; with tubules 14 to 16; between lateral line and origin of dorsal 3; between lateral line and vent 10.

Body ellipsoid and well compressed, its depth 2 to 2.1 in length; head 3 to 3.1, moderately large, with dorsal and ventral profiles similar; depth of caudal peduncle 6.3 to 6.7. Inter-orbital space convex, 3 to 3.2 in length of head; eye large, rounded, its diameter 2.4 to 2.8, or longer than snout, which is 3.3 to 3.4 in head; mouth small, slightly oblique, jaws about even; maxillary 3 to 3.4 in head, and reaching posteriorly to below front edge of eye; tip of snout on a level with lower margin of orbit; teeth in two series, those in front with truncate edges, those behind small, slender, and with rounded or slightly pointed tips. Preorbital slightly notched in front, its width at posterior end of maxillary about one-third eye diameter; opercle armed behind with a flat spine.

Scales on top of head extending to nostrils, leaving the space from there to tip of snout naked; both preorbital and suborbital naked; vertical limb of preopercle also unscaled. Middle dorsal spines highest. Soft vertical fins rounded and nearly the same height; caudal emarginate with the lobes slightly rounded, pectoral moderate, rather broad, reaching origin of anal fin; ventral extending to base of anal spines.

Fresh specimens violet blue, contrasting with the bright lemon yellow of the caudal peduncle and the anterior portion of fin; caudal fin dusky outwardly; the other fins dark brown, excepting pectoral which is pale; each side of head with three oblique, bluish white streaks and many spots; scales of body with vertical bluish white streaks and edged with dusky.

Ground color in alcohol brownish violet; caudal peduncle and anterior portion of fin yellowish; caudal fin dusky on its outer half; vertical fins dusky brown; pectoral pale; ventrals

dusky; three oblique bluish white streaks on each side of head; each scale on head with a bluish white spot; scales on body with bluish white vertical streaks and edged with blackish; a dusky spot at base and axil of pectoral.

The above description is of three specimens, 29 to 36 millimeters in length, collected by Albert W. Herre at Tawitawi and Bungau Islands, Sulu Archipelago.

This species has been recorded from the "Philippine Islands" by Fowler.

CHRYSIPTERA CYANEA (Quoy and Gaimard)

Glyphisodon cyaneus QUOY and GAIMARD, Voy. Uranie, Zool. 2 (1824) 392, pl. 64, fig. 3.

Glyphidodontops cyaneus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 130; Atlas Ichth. 9 (1878) pl. 409, fig. 2.

Abudefduf cyaneus EVERMANN and SEALE, Bull. U. S. Bur. Fisheries 26 (1907) 92.

Glyphisodon azureus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 359; GÜNTHER, Cat. Fishes 4 (1862) 53.

Dorsal XIII, 12 or 13; anal II, 12; scales in lateral series 25; with tubules 17 or 18; between lateral line and origin of dorsal 3; between lateral line and vent 9.

Body ovate-oblong, the profiles equally elevated, depth of body 2.2 to 2.3 in length; head 3.1 to 3.2; depth of caudal peduncle 6.5 to 6.8. Interorbital space strongly arched, 3.1 to 3.8 in length of head; eye round and fairly large, diameter 2.8 to 3.3, longer than snout which is contained 3.3 to 3.7 in head; maxillary long, 2.8 to 3 in head, extending posteriorly considerably behind vertical through anterior margin of orbit. Mouth slightly oblique, lower jaw a little included; teeth biserial in each jaw, with blunt tips. Width of preorbital at posterior end of maxillary about one-third diameter of eye; opercle with two flat spines at its hind edge.

Scales on top of head stopping at front rim of orbit; none on orbital ring or on edges of preopercle; a low sheath of scales at base of vertical fins. Middle dorsal spines highest. Soft dorsal and anal almost angular; pectoral shorter than anal and almost reaching vent.

Color in spirits brownish violet; the bluish color apparently has faded out; two short lines on head, one in front of eye meeting the other line on the opposite side at tip of snout, and the other across preorbital; all the fins yellowish.

Described from two examples, 32 and 34 millimeters long, which have been recorded from Bacon, Sorsogon, by Evermann and Seale, and from four others, 42 to 54 millimeters long, which

were collected by E. H. Taylor at the southern coast of Cotabato Province.

Contrary to the account of Evermann and Seale, the specimens in the Bureau of Science collection and the one in the museum of Stanford University show very well two yellowish streaks on the anterior portion of the head and the dull yellow color on all the fins, thus removing any doubt as to their identity. All the specimens agree with the figure and description of Quoy and Gaimard.

This species is known only from the Indo-Australasian Archipelago and the Friendly Islands.

CHRYSIPTERA ASSIMILIS (Günther)

PLATE 10, FIG. 1

Glyphisodon assimilis GÜNTHER, Cat. Fishes 4 (1862) 52; PETERS, Mon. König. Akad. Wiss. Berlin (1868) 271, var.

Glyphisodon uniocellatus BLEEKER, Nat. Tijds. Ned. Ind. 4 (1853) 119; not of Quoy and Gaimard.

Glyphidodontops uniocellatus BLEEKER, Atlas Ichth. 9 (1878) pl. 410, fig. 6.

Abudefduf sapphirus JORDAN and RICHARDSON, Bull. U. S. Bur. Fisheries 27 (1908) 264, fig. 10.

Dorsal XIII, 11 to 13; anal II, 12 or 13; scales in lateral series 26; with tubules 16 or 17; between lateral line and origin of dorsal 3; between lateral line and vent 10.

Body rather elongate, with dorsal and ventral profiles similar; depth contained 2 to 2.3 in length; head 3.1 to 3.4; depth of caudal peduncle 6.1 to 6.6. Interorbital space convex, its width 3 to 3.6 in length of head; eye circular, contained 2.7 to 3.3; snout rather short, only 3.4 to 4 in head; maxillary 2.8 to 3.3, extending posteriorly beyond anterior margin of orbit. Mouth oblique, jaws equal; teeth in a double series, with rounded edges. Orbital ring very narrow, its width at posterior end of maxillary scarcely half diameter of eye; opercle with two flat spines behind.

No scales on snout, orbitals, or preopercular limbs. Middle dorsal spines higher than posterior ones. Rayed dorsal and anal rounded; caudal slightly emarginate, with the lobes rounded; pectoral terminating above vent; outer ray of anal prolonged and extending to origin of anal.

Color in alcohol varying from deep blue to yellowish brown, with one or two black dots on each scale, which have faded in some of the specimens; a blackish violet streak along middle of nape and forehead; another one from origin of lateral line,

through eye to snout, meeting that of the other side; and a third one crossing preorbital and upper jaw. A horizontal series of specks of similar color across cheek. A round black spot, if present, occupies the base of the middle dorsal rays. In some examples, the outer portion of caudal and soft vertical fins is yellowish blue, and in others blackish.

The above account is based upon forty-six examples, varying from 16.5 to 46 millimeters in length. They were collected at the following localities: Nalvo, Luna, La Union; Calapan, Mindoro; Apo Reef, off the coast of Mindoro; Bantayan Island; Canigaran, Palawan; and Sibutu and Sitankai Islands, Sulu Archipelago. A single specimen, 32 millimeters long, taken at Canigaran in November, 1925, is a ripe female.

This species has been previously recorded by Günther from one specimen marked "Philippine Islands," and by Jordan and Richardson from six examples collected by R. C. McGregor at Ticao Island, as *Abudefduf sapphirus*.

Living specimens in the Bureau of Science aquarium are deep sky blue, with two blackish violet streaks on each side of head and a longitudinal band of the same color on top of head; the fins lighter than the ground color. Vertical and caudal fins of those having a black spot at base of some of the dorsal rays edged with blackish; in some specimens all the fins uniformly bluish, without blackish markings of any kind; in others the vertical fins with blackish margins and the caudal uniformly bluish or partially edged with blackish.

Günther observes that there is considerable variation in the color pattern of the caudal fin, which is also exhibited in my examples and, in view of this fact, I cannot accept *Abudefduf sapphirus* as a distinct species. The dorsal spot in *Chrysiptera assimilis* is more anterior than in *Glyphisodon uniocellatus* Quoy and Gaimard.

This species is found in the Indo-Australasian Archipelago to the east of Borneo.

CHRYSIPTERA TURCHESIUS (Jordan and Seale)

Abudefduf turchesius JORDAN and SEALE, Bull. U. S. Bur. Fisheries 26 (1907) 28, fig. 10; SNYDER, Proc. U. S. Nat. Mus. 42 (1912) 505.

Dorsal XIII, 11 or 12; anal II, 13; scales in a lateral series 25; with tubules 15 to 17; between lateral line and origin of dorsal 3; between lateral line and vent 10.

Body ovate-oblong, compressed, the depth 2.3 to 2.5 in length; head 3 to 3.3; depth of caudal peduncle 6.3 to 6.6. Width of

the strongly arched interorbital 3.2 to 3.8 in head, or less than length of eye diameter, which is 2.8 to 4.5 in head; snout 3.5 to 3.7 in length of head, its tip on a level with inferior margin of orbit; maxillary 3.1 to 3.6, its posterior end below front margin of orbit. Mouth slightly oblique, jaws even; teeth in two series, very closely appressed, their tips blunt. Preorbital at angle of mouth as wide as a third of eye diameter; opercle armed behind with two flat spines.

The space from front margin of eye to tip of snout unscaled; orbital ring and both inferior and vertical limbs of preopercle also naked. Middle dorsal spines a trifle higher than posterior ones. Rayed anal higher than soft anal, both fins rounded and produced along the middle; caudal obliquely truncate, with the upper lobe slightly longer; pectoral scarcely reaching vent; outer ray of ventral produced into a filament, which touches base of anal spines.

Deep blue in alcohol, lighter on the lower parts, each scale with a lighter margin; all the fins colored same as body, with the outer portion somewhat lighter.

I have examined in the Bureau of Science collection four specimens, 36 to 45.5 millimeters long, taken at Calapan, Mindoro. This species was originally described by Jordan and Seale from Cavite, Cavite.

Contrary to the diagnosis of the authors, this fish has two rows of teeth. J. O. Snyder recorded a number of examples from Okinawa Islands, where it is very common in the pools.

CHRYSIPTERA AMABILIS (De Vis)

PLATE 1, FIG. 2

Glyphisodon amabilis DE VIS, Proc. Linn. Soc. N. S. W. (1883) 353.

Abudefduf amabilis JORDAN and SEALE, Bull. U. S. Bur. Fisheries 25 (1906) 287, pl. 42, fig. 1; JORDAN and RICHARDSON, Bull. U. S. Bur. Fisheries 27 (1908) 264.

Glyphisodon brownriggii var. *xanthozona* GÜNTHER, Fische der Südsee 2 (1876) 234, pl. 127, fig. D; not *Glyphisodon xanthozona* of Bleeker.

Dorsal XIII, 11 or 12; anal II, 12; scales in lateral series 26; with tubules 17 to 19; between lateral line and origin of dorsal 3; between lateral line and vent 8.

Body ovate-oblong, its depth 2.4 to 2.5 in length; head 3.3 to 3.4, its profile convex above and slightly less beneath; depth of caudal peduncle 6.3 to 6.5. Interorbital space convex, rather narrow, 3.2 to 3.4 in head; diameter of eye 2.6 to 2.7, about as long as maxillary, which ends posteriorly below front edge

of orbit; snout equal to width of interorbital space. Teeth in two rows with slightly rounded edges. Greatest width of orbital ring scarcely half diameter of eye; opercle with two flat spines behind.

No scales on the area between nostrils and tip of snout; none on orbitals, edges of preopercle, and chin. Middle dorsal spines as high as posterior ones. Soft anal slightly higher and more pointed than rayed dorsal; caudal slightly emarginate; ventral ending at vent.

Fresh specimens dusky olive, with three crossbands; the first one over the opercle yellowish orange, and two others above vent and across caudal peduncle lemon yellow. Ventrals and anal dusky; soft dorsal and caudal dusky at base and yellowish orange outward; spinous dorsal with a very narrow blackish margin; pectoral very slightly washed with yellow, with a dusky blotch at base; the opercular flap above the larger spine blackish.

Here described from four specimens, 32.5 to 45 millimeters long, collected at Paraoir, Balaoan, and Bauang Sur, La Union. I have examined in the museum of Stanford University three other examples of this species, collected by R. C. McGregor at Calayan Island, as recorded by Jordan and Richardson.

Günther regards this species as *Glyphisodon brownriggii* var. *xanthozona*, from which the species above described differs in the relative position of the second vertical band on the body. It differs also from *xanthozona* of Bleeker in having fewer crossbands and in the absence of a distinct dark blotch at the base of some of the dorsal rays.

This species is known throughout the tropical Pacific Islands.

CHRYSIPTERA BROWNRIGGII (Bennett)

Chaetodon brownriggii BENNETT, Fishes of Ceylon (1828) 8, pl. 8.

Glyphisodon brownriggii CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 362; GÜNTHER, Fische der Südsee 2 (1876) 232, pl. 127, figs. B, C, E.

Abudefduf brownriggii JORDAN and RICHARDSON, Bull. U. S. Bur. Fisheries 27 (1908) 264; WEBER, Fische der Siboga Exped. (1913) 352.

Abudefduf brownriggii var. *zonatus* WEBER, Fische der Siboga Exped. (1913) 353.

Glyphisodon unimaculatus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 358; SCHLEGEL and MÜLLER, Overz. Amphi. Verh. Nat. Ges. Ned. Overz. Bezitt. (1839) 23, pl. 6, fig. 1; BLEEKER, Nat. Tijds. Ned. Ind. 4 (1853) 284; GÜNTHER, Cat. Fishes 4 (1862) 51.

Glyphidodontops unimaculatus BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 140; Atlas Ichth. 9 (1878) pl. 407, fig. 5.

- Abudefduf unimaculatus* JORDAN and SEALE, Proc. U. S. Nat. Mus. 28 (1905) 784; EVERMANN and SEALE, Bull. U. S. Bur. Fisheries 26 (1907) 93; JORDAN and EVERMANN, Bull. U. S. Bur. Fisheries 27 (1908) 263; Weber, Fische der Siboga Exped. (1913) 354.
- Glyphisodon leucopomus* CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 359.
- Glyphisodon antjerius* CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 360; BLEEKER, Nat. Tijd. Ned. Ind. 8 (1855) 454; GÜNTHER, Cat. Fishes 4 (1862) 50; MEYER, Ann., Soc. España Hist. Nat. 14 (1885) 34.
- Abudefduf antjerius* JORDAN and SEALE, Bull. U. S. Bur. Fisheries 25 (1906) 287, pl. 42, fig. 2; EVERMANN and SEALE, Bull. U. S. Bur. Fisheries 26 (1907) 93; JORDAN and EVERMANN, Bull. U. S. Bur. Fisheries 27 (1908) 264; SNYDER, Proc. U. S. Nat. Mus. 42 (1912) 419; FOWLER, Proc. Acad. Nat. Sci. Phila. 70 (1918) 54.
- Glyphisodon biocellatus* CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 361.
- Glyphidodontops zonatus* CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 361; BLEEKER, Nat. Verh. Holl. Maats. Wet. 2 (1877) 138; Atlas Ichth. 9 (1878) pl. 407, fig. 3.
- Abudefduf zonatus* JORDAN and SEALE, Bull. U. S. Bur. Fisheries 25 (1906) 286; EVERMANN and SEALE, Bull. U. S. Bur. Fisheries 26 (1907) 92; JORDAN and EVERMANN, Bull. U. S. Bur. Fisheries 27 (1908) 263.
- Glyphisodon punctulatus* CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 362.
- Glyphisodon xanthozona* BLEEKER, Nat. Tijd. Ned. Ind. 4 (1853) 283; GÜNTHER, Cat. Fishes 4 (1862) 43.
- Glyphisodon rossii* BLEEKER, Nat. Tijd. Ned. Ind. 7 (1854) 48.
- Glyphisodon dispar* GÜNTHER, Cat. Fishes 4 (1862) 53.
- Glyphisodon modestus* GÜNTHER, Cat. Fishes 4 (1862) 55.
- Glyphisodon mutabilis* CARTIER, Verh. Phys. Med. Ges. Würzburg (1873) 100.
- Glyphisodon tenioruptus* CARTIER, Verh. Phys. Med. Ges. Würzburg (1873) 101.
- Glyphisodon cingulatus* var. near n. sp. ? CARTIER, Verh. Phys. Med. Ges. Würzburg (1873) 101.
- Glyphidodontops modestus* BLEEKER, Atlas Ichth. 9 (1878) pl. 403, fig. 9.

Dorsal XIII, 11 to 14; anal II, 11 to 13; scales in lateral series 25; with tubules 16 to 19; between lateral line and origin of dorsal 3; between lateral line and vent 9.

Body ovate-oblong; upper profile of head slightly more arched than lower; depth of body 2 to 2.3 the length; head 3 to 3.4 or about twice the depth of caudal peduncle. Interorbital space convex and narrow, equal to or a trifle narrower than diameter of eye, which is 3 to 3.7 in length of head. Snout 3 to 3.6 in head, its tip not quite on a level with inferior edge of eye; maxillary contained 3 to 3.4, ending posteriorly a little before

front margin of orbit; in large specimens snout and maxillary about equal in length, each slightly longer than eye, while in the young the eye is relatively much larger in proportion. Jaws even, forming an almost horizontal gape; teeth in two rows, rather slender, with rounded tips. Width of preorbital at hind end of maxillary about half diameter of eye; opercle with two flat spines behind.

Snout, orbital ring, and both vertical and inferior edges of preopercle naked; scales on top of head extending only to nostrils. Dorsal spines evenly graduated to the last, which is the highest. Soft portion of dorsal and anal rounded; caudal slightly emarginate with the lobes rounded; pectoral about as long as ventral and ending slightly before anus; outer ray of ventral more or less produced, extending to anal opening.

My total of one hundred twenty-eight examples of various sizes divides naturally into three excellent parallel color series. These show well the gradual variation of color markings due to age and their striking gradation in the different series. The young in all the series have bluish lines on the head, convergent at the snout, and all show that there are two distinct dark ocelli edged with blue, one under the last dorsal spines and the other at the base of the posterior rays. These color markings are absent in adult individuals. The lines on the head seem to disappear first, followed by the first dorsal ocellus. The ground color in alcohol of all the specimens varies from yellowish brown with purplish wash to dusky olive; a light or vertical streak on each scale; pectoral, caudal, and posterior rays of dorsal yellowish, the last two fins having a dark edge; ventrals and anal blackish. The yellowish crossband on body, absent in one series, appears to be persistent in all the stages of the other two, and these two series differ from each other in the presence in one of them of a light colored spot on top of the caudal peduncle immediately after the dorsal fin.

The color in alcohol of various specimens is as follows:

Twenty-eight specimens, 22 to 54 millimeters long, which I collected at the same time at Nalvo, Luna, La Union, represent an interesting series to show the gradual changes of color markings due to age. Ground color in alcohol greenish olive, each scale with a light vertical streak or spot; anal blackish, pectoral pale, soft dorsal slightly dusky, caudal yellowish toward the base and tipped with dusky. The second dorsal ocellus is persistent in all the stages, and the first one absent in individuals over 35 millimeters in length. The bluish lines on head are

present in specimens up to 43 millimeters long. In the very young these lines are wide and long, being continued to the first dorsal ocellus, while in the older examples they are narrower and shorter. There is a short bluish line in front of eye and a much longer one on the suborbital of all the specimens. No yellowish vertical band is present on body.

Belonging also to the above series are fifty-seven examples, 20 to 57 millimeters long, coming from Currimao, Ilocos Norte; Luna and Paraoir, La Union; Nasugbu, Batangas; Puerto Galera and Calapan, Mindoro; Bacon, Sorsogon; Despujols, Tablas; Cabalian, Leyte; Canigaran, Palawan; Port Canoan and Lazi, Siquijor; Balabac Island; and Cotabato Province, Mindanao. They are brownish olive in alcohol, with a light vertical streak or spot on each scale. A short bluish line is present in front of eye, and a longer one on suborbital. There is persistent at the base of the last dorsal rays in all stages a black spot, which appears to be continued on the axil of the fin. Pectoral, caudal, and hind portion of rayed dorsal yellowish white, the last two fins with a blackish edge. Anal and ventrals blackish, caudal peduncle light posteriorly. In a specimen, 36 millimeters long, the second dorsal ocellus appears as a small spot, and the bluish lines on top of head are very fine. In smaller individuals there are two dorsal ocelli, and the bluish lines are usually present and well marked. These lines may also be present in some individuals up to 57 millimeters long.

The second series consists of twenty-three specimens, 25 to 68 millimeters long, coming from Currimao, Ilocos Norte; Nalvo, Luna, La Union; Polillo Island; Cebu, Cebu; San Juan, Siquijor Island; Canigao Island, Leyte; Balabac Island, Palawan; and Cotabato Province, Mindanao. They are dusky olive, with a rather indistinct light crossband on body and well-marked blue lines on top of head in very young specimens. Pectoral, caudal, and soft dorsal pale, the last two fins tipped with dusky. Individuals less than 47 millimeters in length have two dorsal ocelli, and one, 50 millimeters long, has the second ocellus at the base of the last dorsal rays. None in this series has a light spot at the axil of the dorsal fin. A specimen from San Juan, Siquijor Island, has the pectoral and caudal orange yellow.

Thirty examples, 23 to 84 millimeters long, from San Fernando, La Union; Bulan, Sorsogon; Canigaran and Balabac Island, Palawan; Samal Island, Mindanao; and Cagayan Sulu, Sitankai, and Saluag Islands, Sulu Archipelago, compose the third series. The ground color is yellowish brown in alcohol

with a well-marked lemon yellow transverse band on body, a light spot or streak on each scale, and a yellow dot immediately behind the rayed dorsal. In examples up to 35 millimeters long the two black dorsal ocelli and the bluish lines on the head are present, the latter color marking being absent in the rest of the individuals. The two dorsal ocelli are to be found in specimens up to 46 millimeters in length. An example, measuring 50 millimeters long, has the second ocellus only, and larger ones do not have any of the dorsal ocelli.

Of the examples above described, forty-nine have spawned or are in near-breeding condition. They range from 35 to 85 millimeters in length, and were collected at the following localities:

- Currimao, 1 ripe female.
- Nalvo, 6 ripe females.
- Paraair, 1 ripe female.
- Calapan, 8 ripe females, 2 ripe males, and 3 spent females.
- Cebu, 1 ripe female.
- Canigao Island, 2 ripe females and 1 ripe male.
- Port Canogan, 1 ripe female.
- Lazi, 1 ripe female.
- Canigaran, 1 ripe female.
- Balabac, 3 ripe females and 3 ripe males.
- Samal Island, 4 ripe females.
- Cotabato Province, 3 ripe females.
- Sitankai Island, 4 ripe females.
- Saluag Island, 1 ripe female and 3 spent females.

This fish breeds throughout the year, since the specimens referred to above were collected at all seasons.

Previously this species has been recorded in the Philippines from Cebu by Meyer; from Cebu and Bohol by Cartier; from Negros by Jordan and Seale; from Calayan and Cagayancillo by Jordan and Richardson; from Bacon by Evermann and Seale; from Sanguisiapo, Sulu Archipelago, by Weber; and from "Philippine Islands" by Fowler.

The Bureau of Science aquarium specimens are yellowish brown, slightly darker on posterior half of body, including caudal peduncle and anal fin. Ventrals blackish and the rest of the fins lemon yellow. There is a black spot at base of last dorsal rays.

It appears that this species undergoes considerable change in coloration, so that a great many species have been described. Some of my specimens, for example, which have the bluish lines on the head, the light vertical band on the body, and the two

dark ocelli on the dorsal fin, show that the *Abudefduf antjerius* and *Abudefduf zonatus* of Jordan and Seale are identical. The original *Chaetodon brownriggii* Bennett is undoubtedly the young of the present species.

This widely distributed species is known to occur from the Red Sea and the east coast of Africa throughout the Indo-Australasian Archipelago to Polynesia.

CHRYSIPTERA REX (Snyder)

Abudefduf rex SNYDER, Proc. U. S. Nat. Mus. 36 (1909) 601, pl. 64, fig. 3.

Dorsal XIII, 13; anal II, 13; scales in lateral series 24; with tubules 15 and 16; between lateral line and origin of dorsal 3; between lateral line and vent 10.

Body moderately elongate, dorsal and ventral contours similar; depth 2.1 to 2.2 in length; head 3.1 to 3.2; depth of caudal peduncle 6.2. Interorbital space convex, 3.3 to 3.9 in length of head; snout 4; mouth slightly oblique, with the jaws equal; maxillary, which is contained 3.4 to 3.8 in head, is equal to diameter of eye and ends posteriorly a little behind anterior edge of orbit; teeth in a double series, compressed, with pointed tips. Greatest width of preorbital less than half eye diameter.

Head completely scaled excepting portion of snout in front of nostrils. Dorsal spines increasing in height posteriorly, the last one about as high as second anal spine. Soft vertical fins angular; caudal notched; pectoral shorter than head; ventral much longer, its outer ray produced into a filament which extends to base of anterior anal rays.

Color in alcohol brownish, with a light dot at center of each scale. A narrow bluish line from front of orbit to snout, and appearing to unite with that on the other side; a short one across preorbital; a row of bluish dots more or less connected, directly below eye. Opercle and preopercle with some bluish spots, and origin of lateral line with a small black dot; all the fins yellowish white.

Here described from two specimens, 31 and 38 millimeters long, obtained at Sitankai Island, Sulu Archipelago. Contrary to Snyder's diagnosis, this species has two rows of teeth. The Philippine examples are identical with the Japanese representatives that I examined at Stanford University.

This species, which has not been noted previously from the Philippines, was originally described by Snyder from specimens

collected at Naha, Okinawa Islands, where it is well represented in the tide pools.

CHRYSIPTERA GLAUCA (Cuvier and Valenciennes)

Glyphisodon glaucus CUVIER and VALENCIENNES, Hist. Nat. Poiss. 5 (1830) 353; JORDAN and SEALE, Bull. U. S. Bur. Fisheries 25 (1906) 286; EVERMANN and SEALE, Bull. U. S. Bur. Fisheries 26 (1907) 93; JORDAN and RICHARDSON, Bull. U. S. Bur. Fisheries 27 (1908) 264.

Dorsal XIII, 14; anal II, 15; scales in lateral series 25; with tubules 18; between lateral line and origin of dorsal 4; between lateral line and vent 9.

Body ovate-oblong, dorsal outline a low even curve from snout to caudal peduncle, ventral outline similar to dorsal; depth of body 2.1 in length; head 3.3; depth of caudal peduncle 6.5. Inter-orbital space strongly arched, its width 2.8 in length of head and nearly equal to the diameter of the large round eye, which is contained 2.6 in head; snout rounded and rather short, 4 in head, its tip above lower edge of orbit; maxillary slightly longer than snout and contained 3.2 in head, its posterior end on a vertical line with front margin of eye. Cleft of mouth very oblique; jaws even, teeth conical, in two rows in each jaw. Width of pre-orbital at posterior end of maxillary about a third of orbit's diameter; opercle with a blunt, flat spine behind.

Head completely scaled; base of the rayed dorsal and anal with a low sheath of small scales. Middle dorsal spines higher than posterior ones. Soft dorsal and anal pointed and equal in height; caudal emarginate; pectoral and ventral fins nearly equal in length and both extending to vent.

Uniformly grayish brown in alcohol, with no spots or bands anywhere on head and body; all the fins yellowish.

One specimen that I examined in the Bureau of Science collection is 39.5 millimeters in length and was collected by C. J. Pierson at Bacon, Sorsogon, as recorded by Evermann and Seale. Three specimens have also been reported from Cagayancillo, Cagayan Islands, and from Ticao Island by Jordan and Richardson.

This species was originally described from Guam and is known from the East Indies northward to the Okinawa Islands. It has been recorded also from Samoa.

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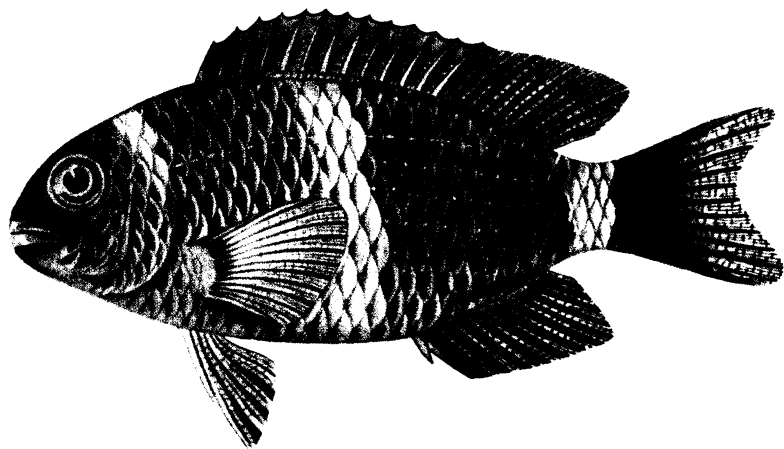
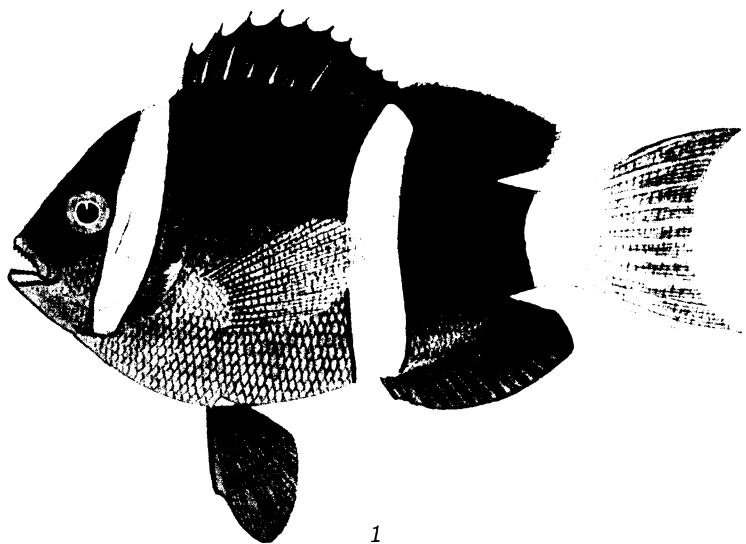
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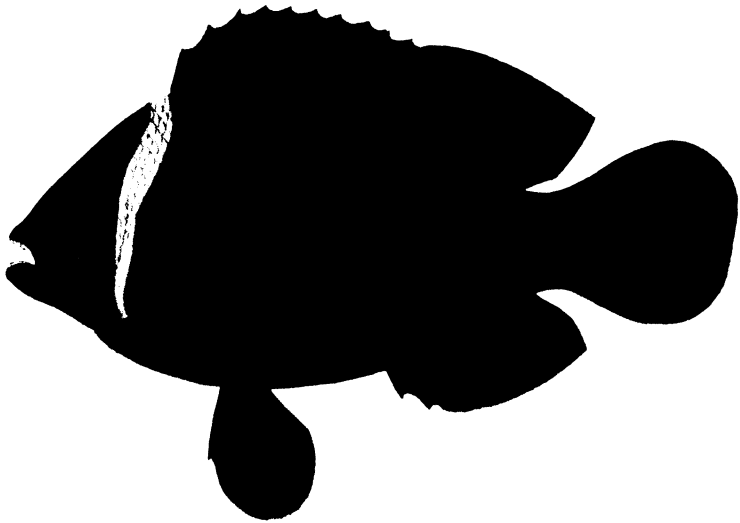
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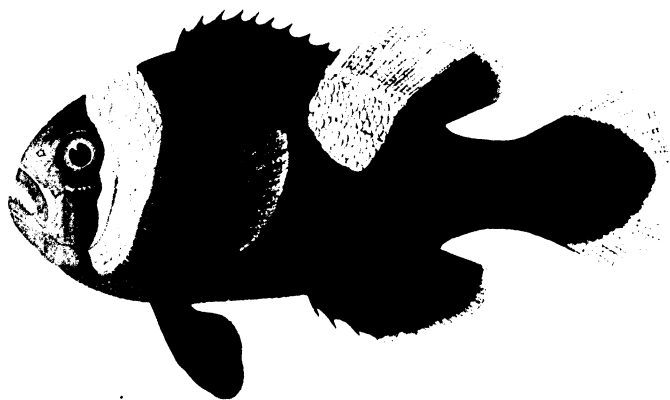




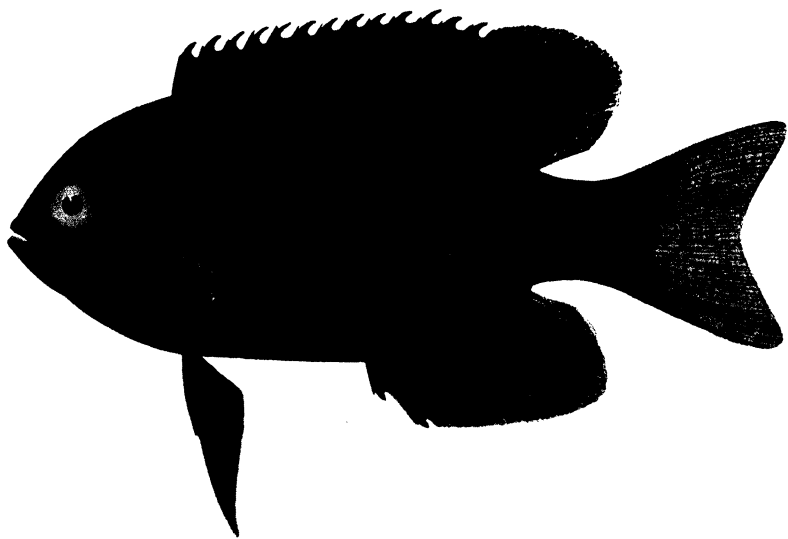
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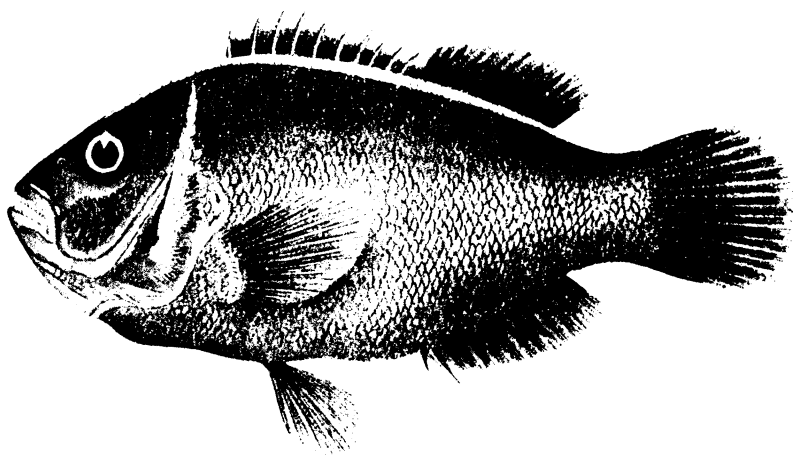
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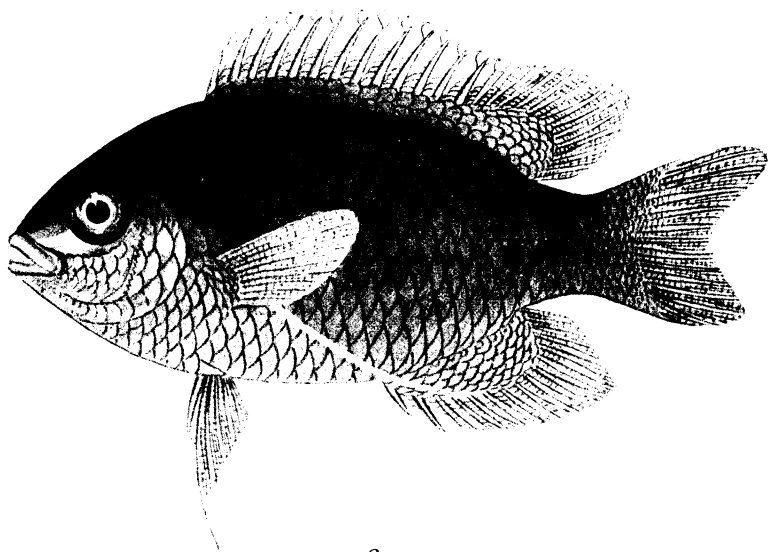
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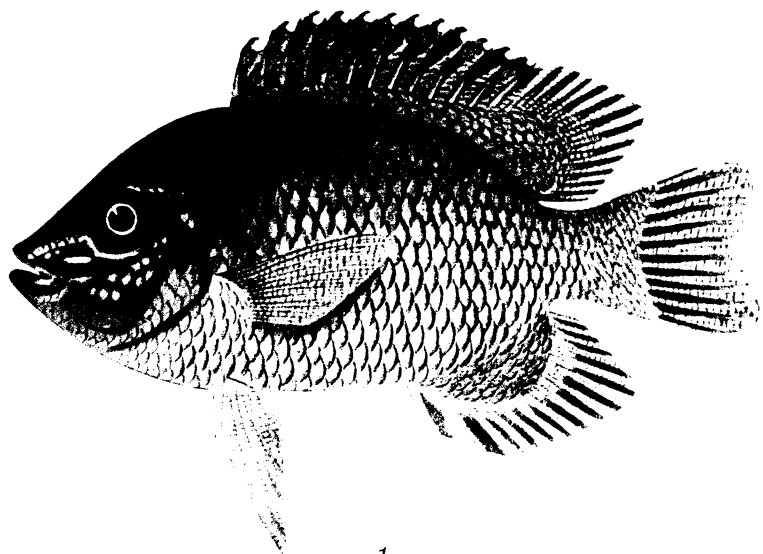
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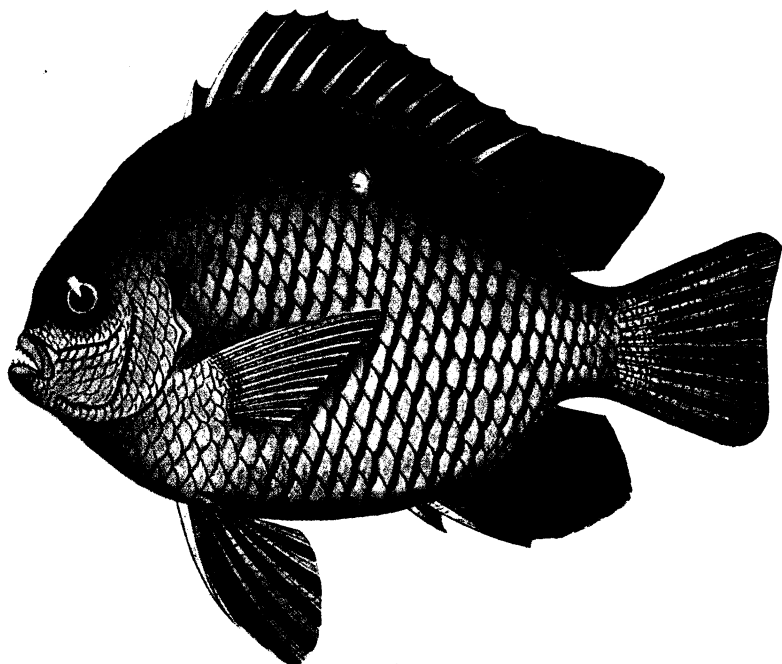
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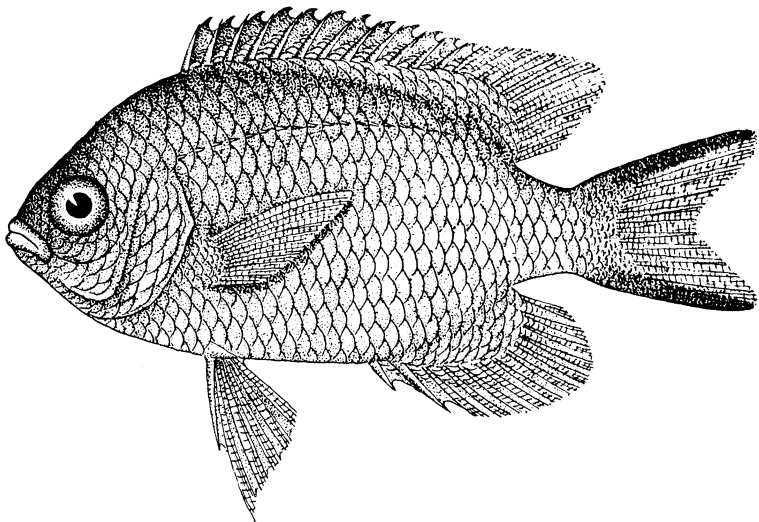
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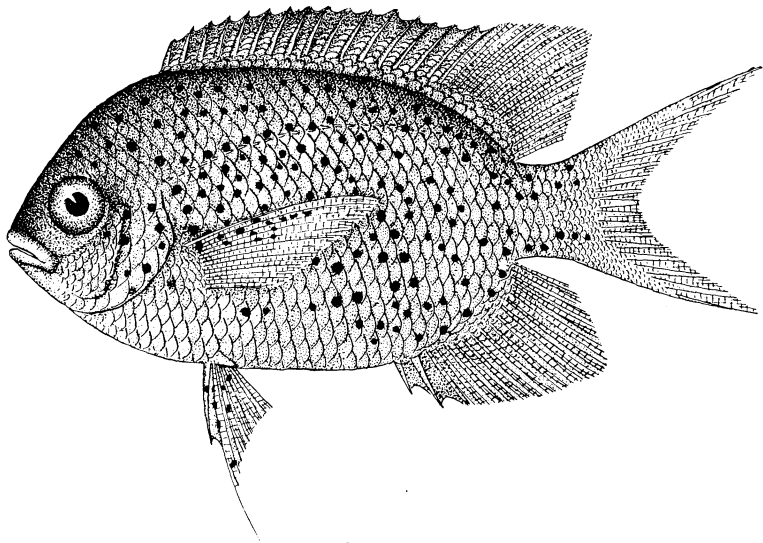
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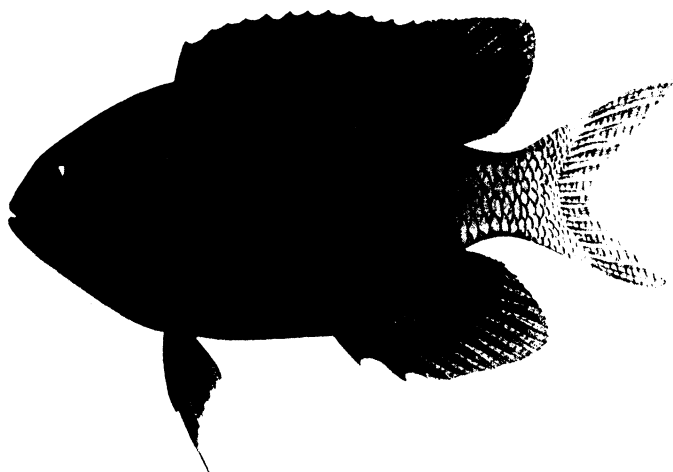
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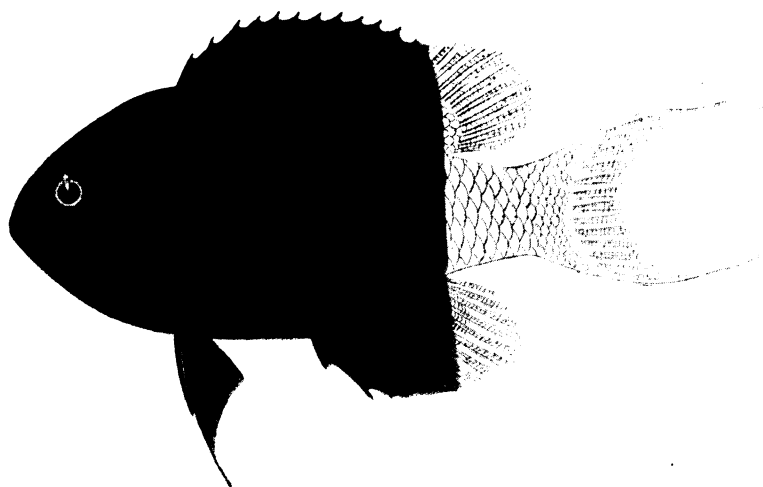
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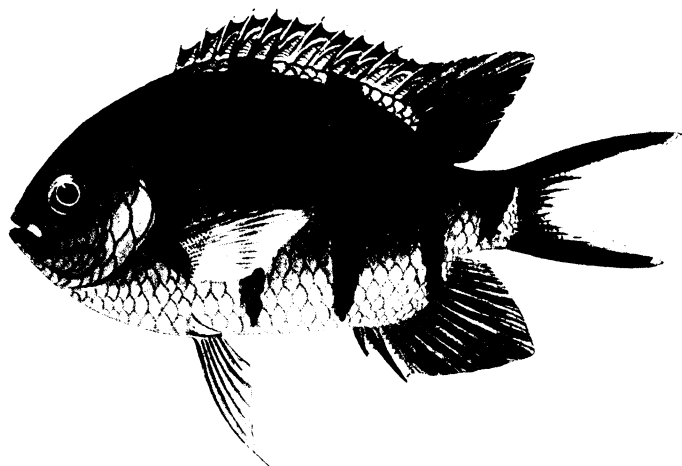


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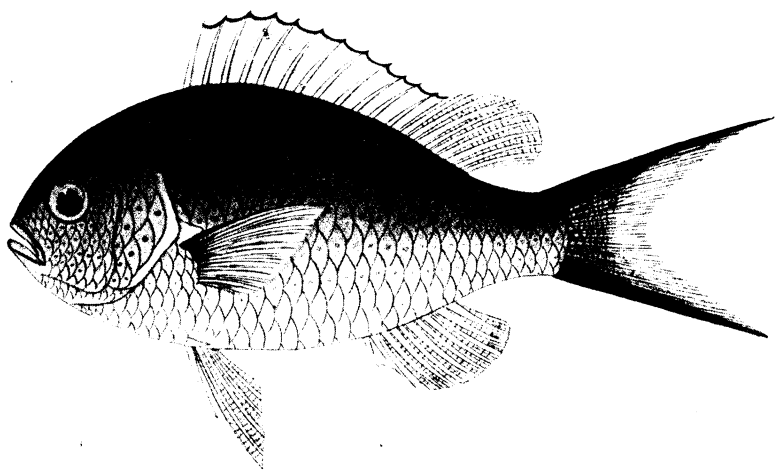


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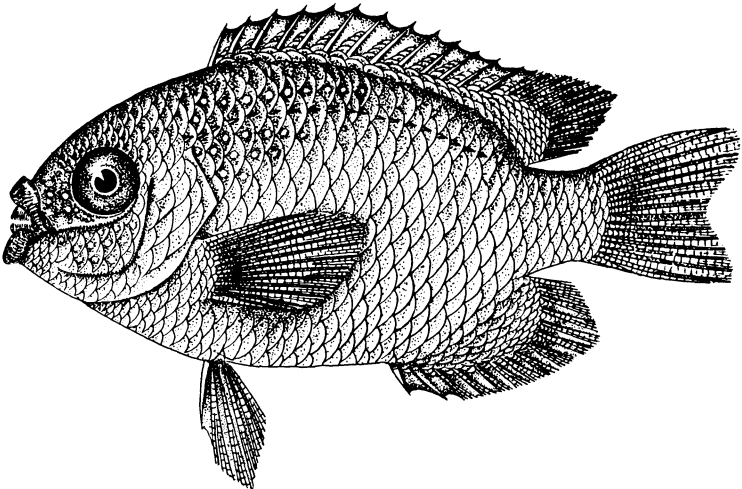




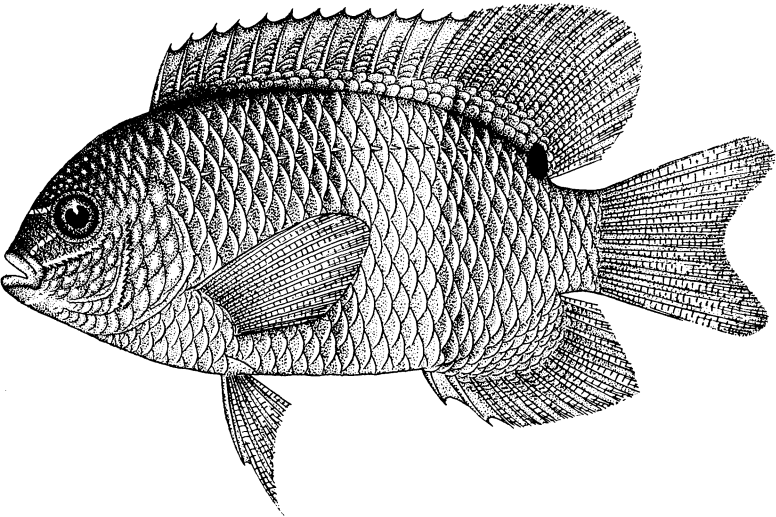
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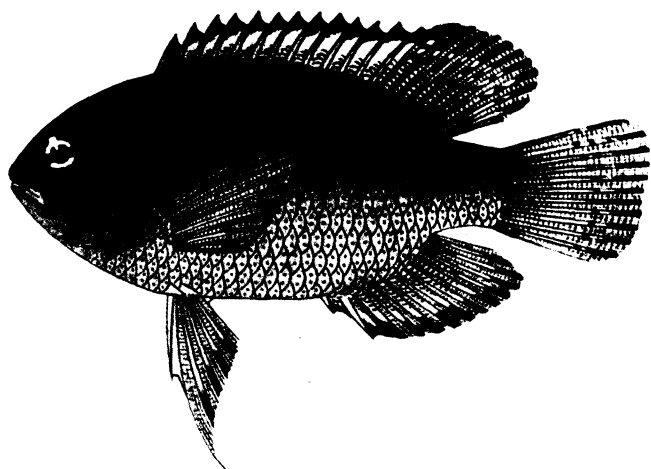
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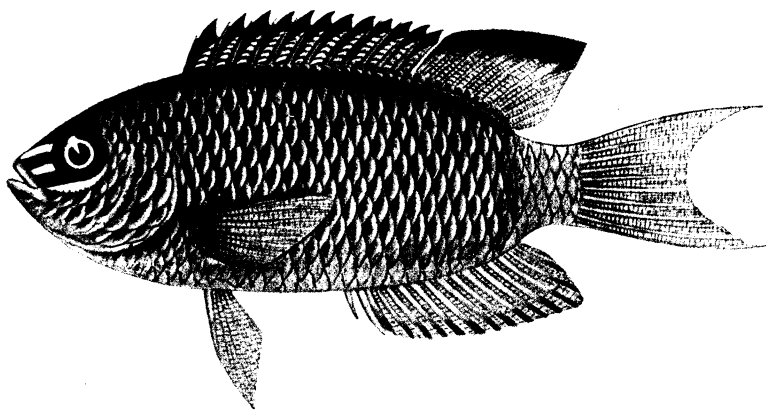
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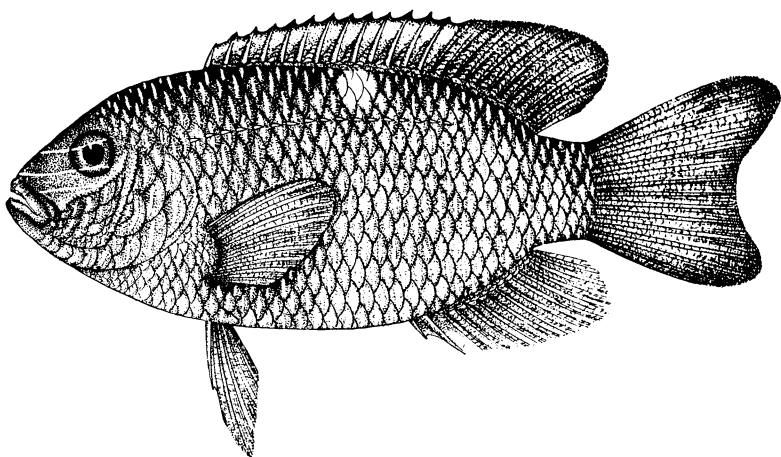
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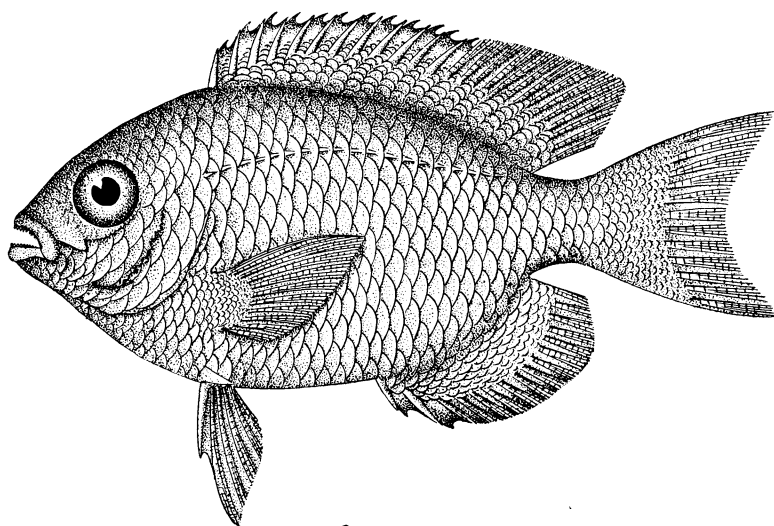
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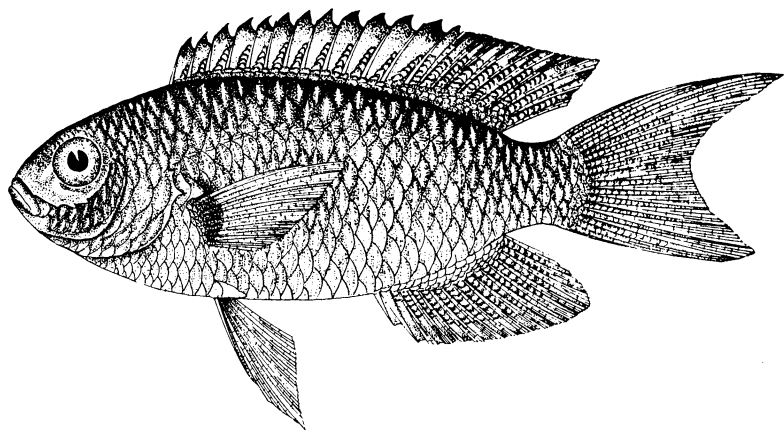
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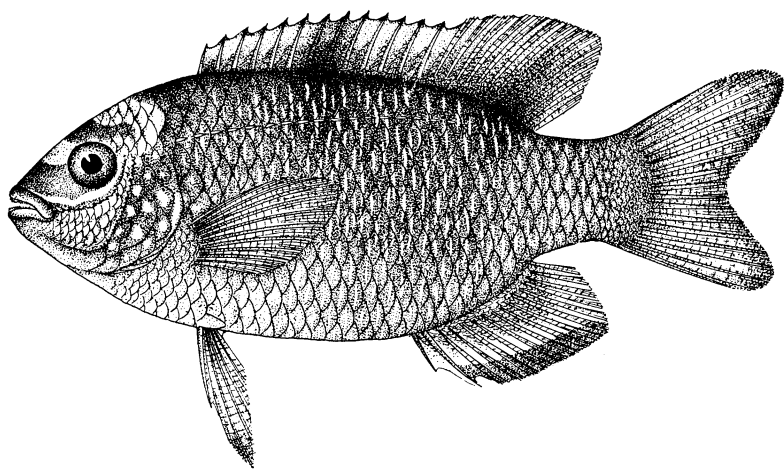
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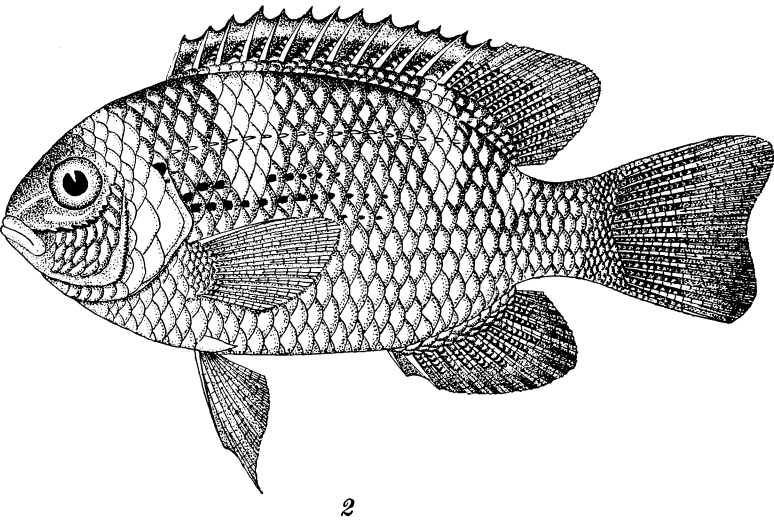
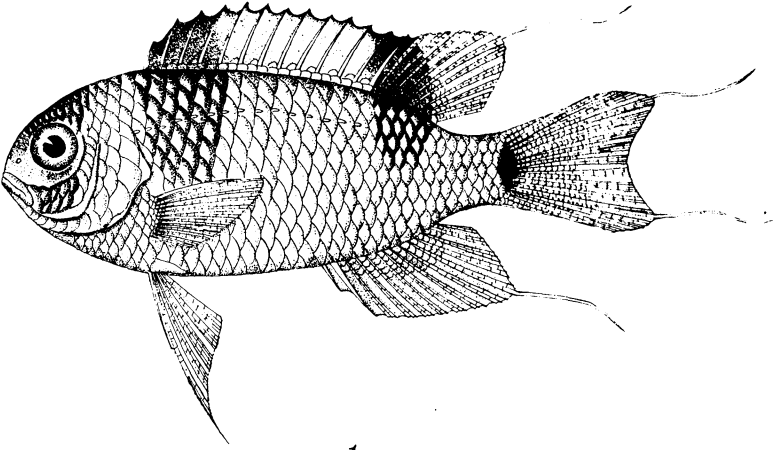
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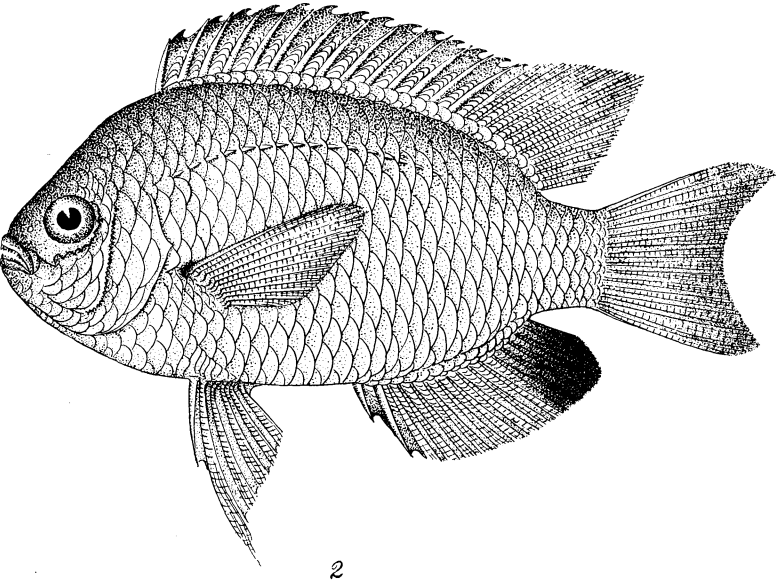
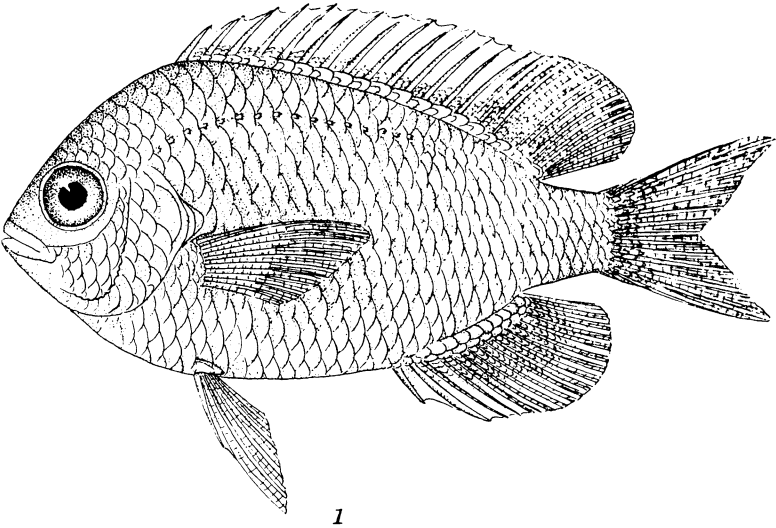


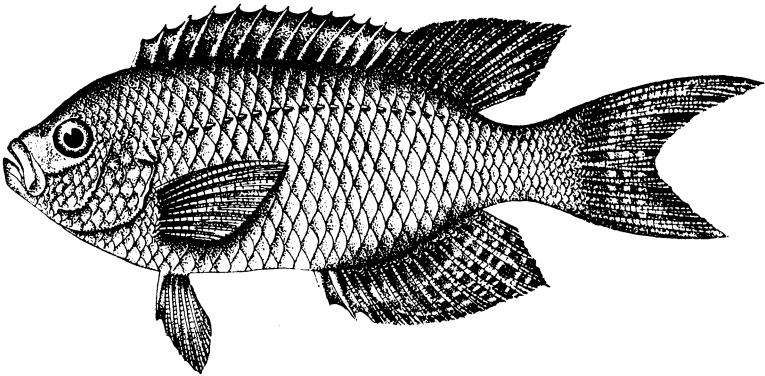
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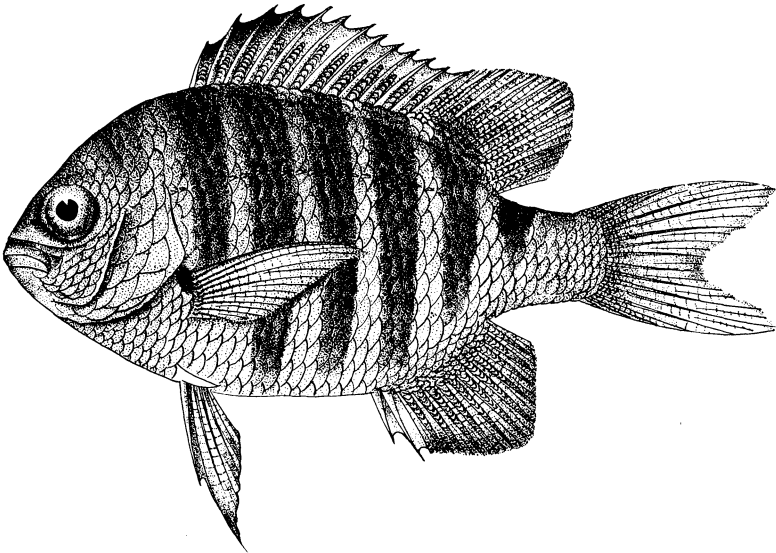
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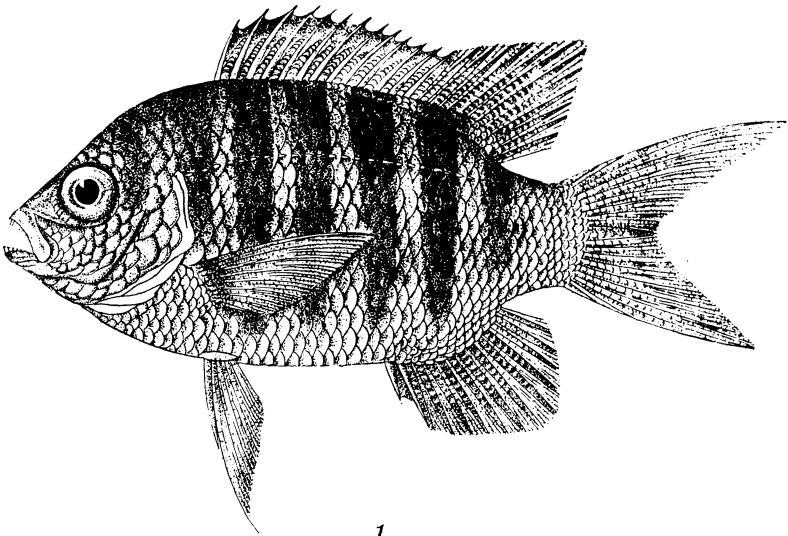




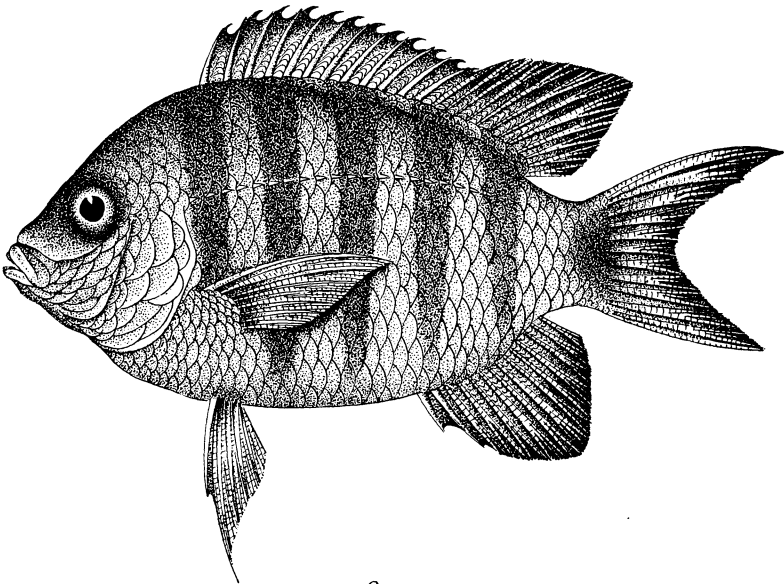
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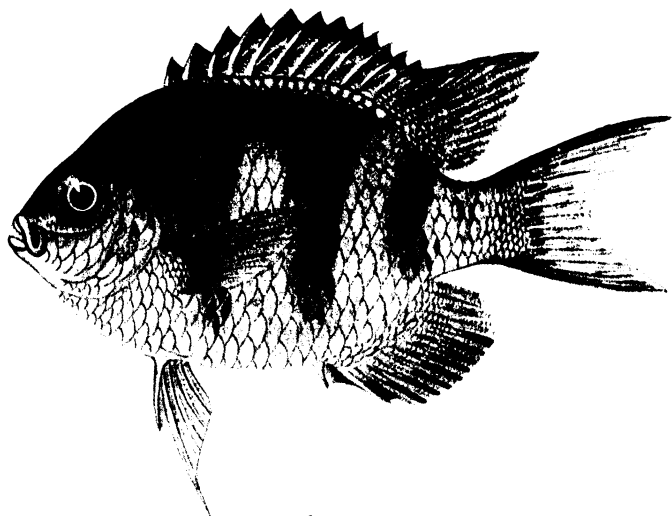
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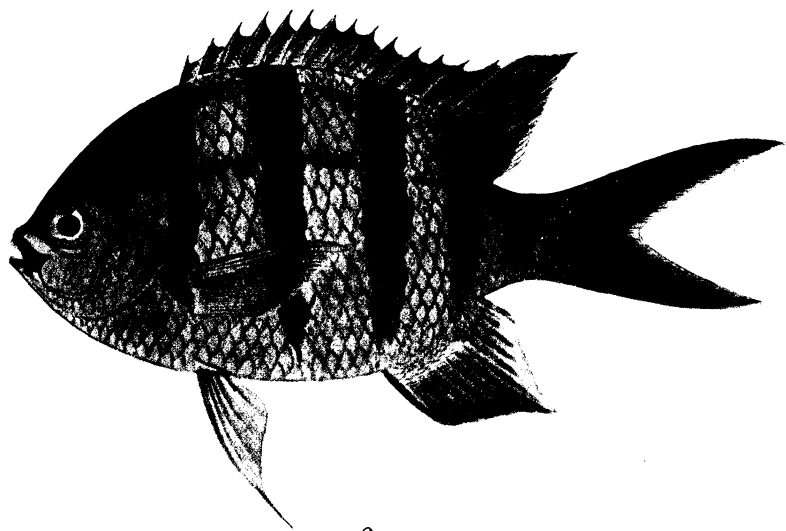
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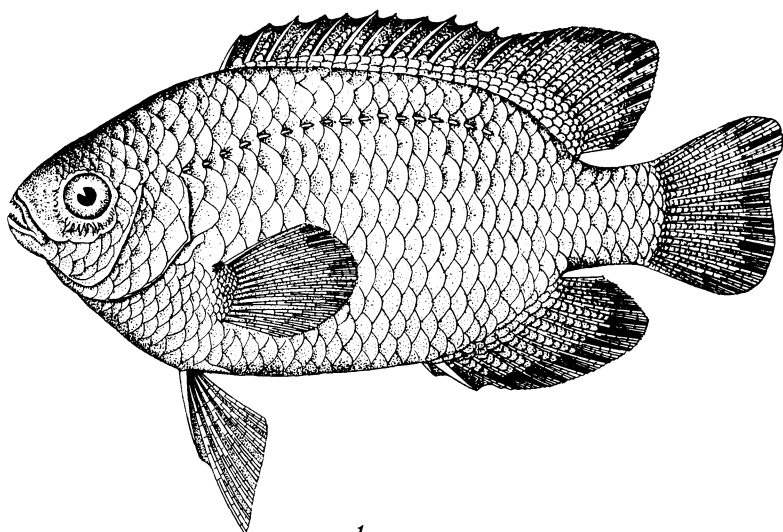
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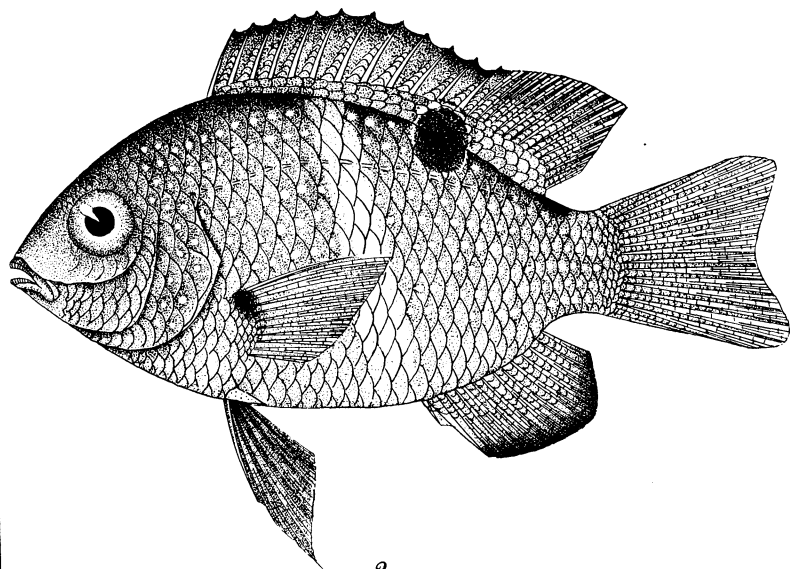
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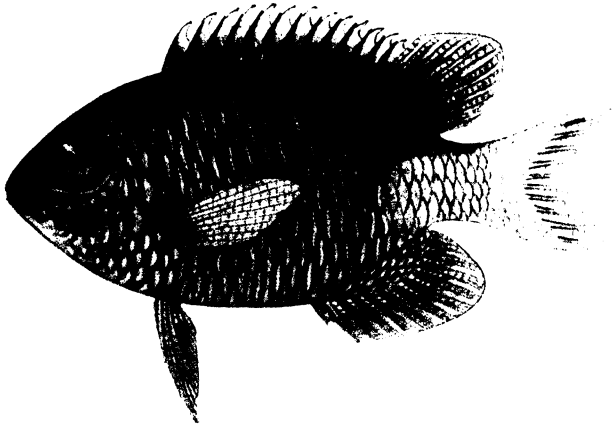
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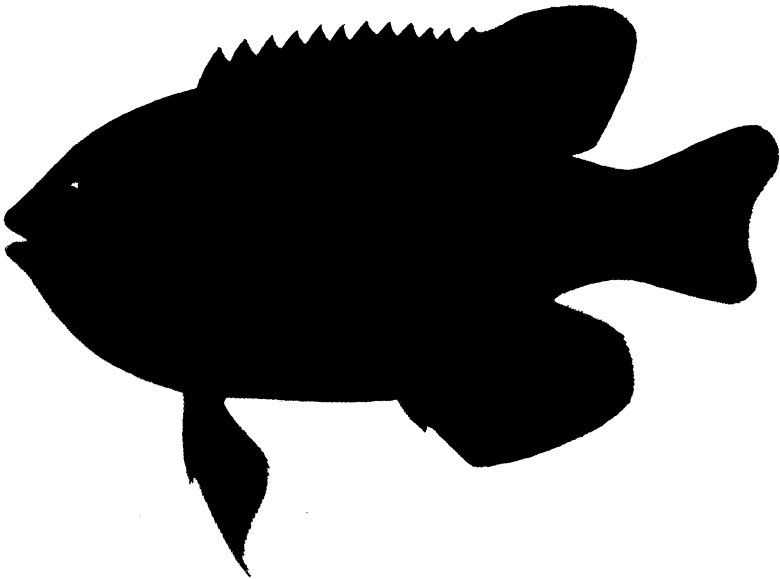
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